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Attention Restraint, Working Memory Capacity, and Mind Wandering: Do Emotional Valence or Intentionality Matter?

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Abstracts of the Psychonomic Society

Volume 24 • November 2019

60[™] ANNUAL MEETING

Palais des congrès de Montréal (Montréal Convention Centre), Québec, Canada Thursday, November 14-Sunday, November 17, 2019

REGISTRATION

Level 5 Foyer

Wednesday, November 13 .. 4:00 p.m.-8:00 p.m. Thursday, November 14....... 7:30 a.m.-8:30 p.m. Friday, November 15.....7:30 a.m.-6:00 p.m. Saturday, November 16......7:30 a.m.-5:00 p.m. Sunday, November 17 7:30 a.m.-12:00 p.m.

OPENING SESSION/KEYNOTE ADDRESS

Room 517D, Level 5

Thursday, November 14....... 7:30 p.m.-8:30 p.m. • Bilingualism Reveals the Networks that

Shape the Mind and Brain Judith Kroll, University of California, Irvine

OPENING RECEPTION

Room 517B, Level 5

Thursday, November 14.. Immediately Following Keynote Address

SYMPOSIA

Room 517D, Level 5 Friday, November 15, 10:00 a.m.-12:00 p.m. Symposium I: What Memory Quirks, Hiccups, and Odd Phenomena Tell Us

Room 517D, Level 5 Friday, November 15, 1:30 p.m.-3:30 p.m. Symposium II: Re-organizing our Understanding of Semantic and Episodic Memory

Room 517D, Level 5 Saturday, November 16, 10:00 a.m.-12:00 p.m. Symposium III: Seeking Explicit Cognitive **Processes in Animals**

Room 517D, Level 5

Saturday, November 16, 1:30 p.m.-3:30 p.m. Symposium IV: Beyond a Single Participant: Interactive Social Cognition in Dyads and Groups



POSTER SESSIONS

Room 517B, Level 5

Session I

- Thursday, November 14...... 6:00 p.m.-7:30 p.m. Session II
- Friday, November 15...... 12:00 p.m.-1:30 p.m. Session III
- Friday, November 15...... 6:00 p.m.-7:30 p.m. Session IV
- Saturday, November 16..... 12:00 p.m.-1:30 p.m. Session V
- Saturday, November 16...... 6:00 p.m.-7:30 p.m.

BUSINESS, AWARDS, AND HAPPY 60TH **BIRTHDAY CHAMPAGNE CELEBRATION**

Room 524A, Level 5

- Saturday, November 16...... 5:10 p.m.-6:30 p.m. Presentation of all Psychonomic Society
 - Awards
- Business of the Psychonomic Society

60TH ANNIVERSARY CELEBRATION

Level 5 Fover

Saturday, November 16...... 6:30 p.m.-7:30 p.m.

FUTURE MEETINGS

- 2020 Austin, TX November 19-22
- 2021 San Diego, CA November 18-21
- 2022 Washington, DC November 17-20
- 2023 San Francisco, CA November 16-19
- 2024 New York City, NY November 21-24
- 2025 Denver, CO November 20-23

www.psychonomic.org

OPENING SESSION/KEYNOTE ADDRESS Bilingualism Reveals the Networks that Shape the Mind and Brain



Judith F. Kroll, *University of California, Irvine* Thursday, November 14, 2019, 7:30 p.m. Room 517D, Level 5

OPENING RECEPTION Thursday, November 14, immediately following Keynote Address Room 517B, Level 5

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NOTICES

Designation of Psychonomic Society Award Winners: A **Q** by an author's name indicates a recipient of the Psychonomic Society Distinguished Leadership, Mid-Career, or Early Career Award.



VENUE/HOTEL

All sessions (spoken and poster) for the 2019 Psychonomic Society Annual Meeting will be held at the Palais des congrès de Montréal (Montréal Convention Centre), 1001 Jean Paul Riopelle Pl, Montréal, Québec H2Z 1H5 Canada.

To maintain the Society's practice of no registration fee for members, it is essential that all hotel rooms reserved for the Annual Meeting be identified as such at the time of booking. To ensure you receive the specially negotiated room rate, please contact:

Le Westin Reservations Online By telephone: +1-866-837-4262 **Room Rate** Single/Double Occupancy: \$219 CAD + taxes Triple Occupancy: \$249 CAD + taxes Quad Occupancy: \$270 CAD + taxes

InterContinental Reservations Online Telephone: +1-514-987-9900

Room Rate

Single/Double Occupancy: \$219 CAD + taxes Triple Occupancy: \$244 CAD + taxes (maximum of one per room, in king-size bedrooms only)

DoubleTree Reservations Online Telephone: +1-800-361-8234 **Room Rate** Single/Double Occupancy: \$199 CAD + taxes Triple Occupancy: \$224 CAD + taxes Quad Occupancy: \$249 CAD + taxes

Please make your reservations no later than October 23, 2019. There are a limited number of rooms available at each hotel, so book early to secure your sleeping room reservations (rooms may be sold out well before this date). Visit the Psychonomic Society website (www.psychonomic.org/2019hotels) to make online reservations.

REGISTRATION

Registration is free to members of the Psychonomic Society. All participants, members and non-members, must register. Registration for non-members is \$75 USD. There is no registration fee for undergraduate students. Membership in the Society is inexpensive and strongly encouraged. Registration will be located in the Level 5 Foyer during the following times:

Wednesday, November 13.....4:00 p.m.-8:00 p.m. Thursday, November 14.......7:30 a.m.-8:00 p.m. Friday, November 15.......7:30 a.m.-6:00 p.m. Saturday, November 16.......7:30 a.m.-5:00 p.m. Sunday, November 17.......7:30 a.m.-12:00 p.m.

All attendees must register. To avoid lines onsite, you are strongly encouraged to preregister through the Psychonomic Society website (www.psychonomic. org/2019registration).

ABSTRACT AND PROGRAM BOOK

Programs will be available in print at the registration desk and as a PDF at www.psychonomic.org/2019AnnualMeeting.

MOBILE APP

A free mobile app for this year's meeting will be available for download in the Apple App Store and Google Play Store a few weeks prior to the Annual Meeting. All versions include the full program and abstracts. It is recommended you download the mobile app before you travel to the Annual Meeting. Internet service may not be available, or slow to download, in the meeting space at the convention center.

MEETING ROOMS

All meetings will be held on Level 5 of the Palais des congrès de Montréal (Montreal Convention Centre).

SPEAKER READY ROOM

Session chairs are encouraged to solicit papers from individuals in their sessions prior to the meeting and load presentations prior to the session in the speaker ready room, located in 522B at the convention center.

Audiovisual support will be available in the speaker ready room to help with loading presentations during the following hours:

TRAVEL TO CANADA

As of March 15, 2016, visa-exempt foreign nationals are expected to have an Electronic Travel Authorization (eTA) to fly to or transit through Canada. Exceptions include U.S. citizens and travelers with a valid Canadian visa. Canadian citizens, including dual citizens, and Canadian permanent residents are not eligible to apply for an eTA. U.S. Permanent Residents possessing a Green Card or valid permit to re-enter the United States require an eTA. You may need an eTA before you board your flight to Canada, even if you are just transiting through the country. Once the application process is complete, most applications are approved within minutes of submission. If you do not receive immediate approval, you will receive an email from the CIC with instructions for completing your application. The authorization is electronically linked to your passport and is valid for five years or until your passport expires, whichever comes first. To find out if you need an eTA to travel to Canada, please visit: http://www.cic.gc.ca/english/visit/visas.asp.

Obtaining a Visa

After identifying that a visa is needed, foreign travelers should contact the U.S. Embassy Consular Section in their country to determine visa processing time frames. For up-to-date information, access the DOS website.

The Society recommends the following guidelines for obtaining a visa for entry into Canada:

- Request a letter of invitation to attend the 2019 Psychonomic Society Annual Meeting from the Society, approximately four months prior to the meeting.
- Apply early. The visa application process takes three to four months to complete.
- Applicants should present their entire trip itinerary, including travel to any countries other than Canada, at the time of visa application.
- If completion of travel plans is contingent upon early approval of the visa application, specify this at the time of the application.
- Provide proof of scientific status.
- Provide meeting website URL and letter of invitation.
- Provide evidence that you intend to return to your country of residence. Applicants should provide proof of "binding," or sufficient ties to their home country or permanent residence abroad. This may include documentation of:

- Family ties in home country or country of legal permanent residence
- Property ownership
- Bank accounts
- An employment contract or statement from an employer stating that the position continues after the meeting.

Requesting a Letter of Invitation from the Psychonomic Society

To request a Letter of Invitation from the Psychonomic Society, please email us at info@psychonomic.org.

TRANSPORTATION

If flying into Montréal, plan your trip to arrive at Montréal–Pierre Elliott Trudeau International Airport or Montréal–Trudeau (airport code YUL). The airport is located on the island of Montreal, 20 km from Downtown Montreal.

Transportation Options to/from Airport and Hotel/ Venue (fees are estimated)

- Private Car Service: \$110 CAD (one way); on request from your hotel
- Taxi fare: \$40 CAD (one way)
- Bus service: \$10 CAD (one way)
- Uber and Lyft

Bus to/from Airport and Hotel/Venue

Featuring 24-hour service, 365 days a year. One-stop route, terminus at Lionel-Groulx métro station, or downtown route including 11 stops in each direction, terminus at Gare d'autocars de Montréal, Berri-UQAM métro station.

Public Transportation

Public transport and taxi are both convenient and affordable ways to get around Montréal. The metro (subway) system is clean, safe, and fast. As an added bonus, the public transit network is relatively simple, with just four lines connecting the downtown center to major tourist sites, bus stops, and train stations. The metro operates daily from 5:30 a.m. to 1:00 a.m. (1:30 a.m. on Saturdays). The average wait time between trains is eight minutes and three minutes during rush hour.

General Information

Driving in Québec

- Québec uses the metric system, so speeds are indicated in kilometres (100 km/h = 62 mph) and gas is sold in litres (3 3/4 litres = 1 US gallon).
- Right turn: Although turning right on a red light is authorized across Québec (except at intersections where a sign indicates this is not permitted), rights on reds are strictly prohibited on the island of Montréal.
- Cell Phone: Use of a hand-held cell phone that does not have a hands-free function is prohibited while driving.
- Parking: There are many paid parking lots and automatic pay stations.

POSTER SESSIONS

All poster sessions will take place in Room 517B on Level 5 of the convention center. The three evening sessions will be held in conjunction with a general reception. Authors of posters are asked to make their posters available for viewing on the following schedule:

Session	Set-up	Viewing	Author Present	Poster Teardown
I: Thursday	3:15 p.m	4:00 p.m	6:00 p.m	7:30 p.m
Evening	3:45 p.m.	7:30 p.m.	7:30 p.m.	8:00 p.m.
II: Friday	10:15 a.m	11:00 a.m	12:00 p.m	1:30 p.m
Noon	10:45 a.m.	1:30 p.m.	1:30 p.m.	2:00 p.m.
III: Friday	3:15 p.m	4:00 p.m	6:00 p.m	7:30 p.m
Evening	3:45 p.m.	7:30 p.m.	7:30 p.m.	8:00 p.m.
IV: Saturday	10:15 a.m	11:00 a.m	12:00 p.m	1:30 p.m
Noon	10:45 a.m.	1:30 p.m.	1:30 p.m.	2:00 p.m.
V: Saturday	3:15 p.m	4:00 p.m	6:00 p.m	7:30 p.m
Evening	3:45 p.m.	7:30 p.m.	7:30 p.m.	8:00 p.m.

NOTE: Each poster must fit on one side of a 4 feet high X 8 feet wide (with a 1-inch frame around the perimeter) poster board, for a total height no greater than 46" and total width no greater than 96".

The extended viewing time will allow all interested persons to see posters of their choice and hopefully reduce the crowded conditions we have sometimes had at the poster sessions. All posters must be removed as soon as the poster session is concluded. Posters that are not removed will be discarded. The numbering of posters this year uses the same system as last year. Abstract numbers assigned to posters are not in sequence with the numbers assigned to talks. Rather, each poster is assigned a six-digit abstract number. The preceeding three numbers represent the poster session number and the proceeding numbers represent the poster location within the poster session (i.e., 001-243).

EXHIBITORS

Attendees are encouraged to visit our exhibitors located in 517B on Level 5 of the convention center. Exhibit hours are:

Thursday, November 14 . . . 3:30 p.m.-10:00 p.m.

Friday, November 15 10:00 a.m.-2:00 p.m., 4:00 p.m.-8:00 p.m. Saturday, November 16. . . 10:00 a.m.-2:00 p.m.,

4:00 p.m.-8:00 p.m.

RECEPTIONS

Opening Reception

Thursday, November 14 (Immediately following the Keynote Address): approximately 8:30 p.m.-10:00 p.m. Room 517B of the convention center.

Diversity & Inclusion Reception

Friday, November 15: 4:30 p.m.-5:30 p.m. Room 524C of the convention center.

Friday Reception & Poster Session

Friday, November 15: 5:30 p.m.-7:30 p.m. (Cash bar) Room 517B of the convention center.

Saturday Reception & Poster Session

Saturday, November 16: 5:30 p.m.-7:30 p.m. (Cash bar) Room 517B of the convention center.

Psychonomic Society 60th Anniversary Celebration

Saturday, November 16: approximately 6:30 p.m.-7:30 p.m. Cake will be served immediately following the Business, Awards, and Happy 60th Birthday Champagne Celebration in the Level 5 Foyer by registration.

COFFEE BREAKS

Complimentary coffee and tea will be available from 9:30 a.m. to 10:30 a.m. in the Level 5 Foyer on Friday, Saturday, and Sunday. Coffee may also be available at outlets in the Convention Centre.

NURSING MOTHER'S ROOM

There is a nursing mother's room at the convention center. A key is available at the main PS registration desk. The room is equipped with comfortable furniture and a private area for nursing, but no refrigerator. Attendees may not use this room for babysitting purposes.

JOGONOMICS

Join your fellow Psychonomes on a 5-mile or 5K fun run/walk. The group will meet in the lobby of the convention center near the entrance by Le Westin and InterContinental hotels at 6:00 a.m. on Saturday, November 16, for final registration and the run will leave promptly at 6:15 a.m. Again, this year we have added a low-key route that will run lower mileage at a more relaxed rate. Organizers: Jeff Zacks and Marianne Lloyd. There is no fee, but you will be required to sign a waiver. Register and sign your waiver in advance to save time in the morning.

AUDIOVISUAL EQUIPMENT FOR TALKS

LCD projectors (e.g., for PowerPoint presentations) and laptop computers (PCs) will be provided in all rooms where spoken sessions are scheduled. Please bring your presentation on a USB drive. Presenters and session chairs are strongly encouraged to visit the speaker ready area in Room 522B well in advance of their talks to review and upload presentations. Alternatively, you are encouraged to be in your session room 30 minutes prior to the beginning of that session to load your presentation. We recommend bringing two copies of your presentation in case of media failure.

Presentations must be created in **16:9 format** to fit formatting of projectors used.

PHOTOGRAPHIC RELEASE

As part of your registration for the 2019 Annual Meeting, the Psychonomic Society reserves the right to use photographs and video taken during the meeting for future marketing purposes. If you do not wish to have your photograph or video used for such purposes, please contact us at the Psychonomic Society Registration Desk.

2019 PROGRAM

There were 1,543 total submissions and 1,507 valid submissions. Of the 1,507 papers that were placed on the program, 300 are spoken papers and 1,207 are posters. In addition, there were four invited symposia.

PROGRAM HISTORY

Year – Site	Valid Submissions
2019 – Montréal	1,507
2018 – New Orleans	1,523
2017 – Vancouver	1,438
2016 – Boston	1,514
2015 – Chicago	1,306

2019 PROGRAM COMMITTEE

- Duane Watson, Chair, Vanderbilt University, USA
- Edward Awh, University of Chicago, USA
- Marc Brysbaert, Ghent University, Belgium
- Kimberly Fenn, Michigan State University, USA
- Angela Gutchess, Brandeis University, USA
- Stephen Mitroff, The George Washington University, USA
- R. Reed Hunt, University of Mississippi, USA, ex officio

PROGRAM AND CONFERENCE ORGANIZATION

The Secretary, R. Reed Hunt, has the responsibility for organizing the program and the Program Committee reviews the schedule. They do so with the indispensable help of Lou Shomette, Executive Director; Amy Bucaida, Meeting Planner; Tiffany Aurora, Director of Membership and Marketing; Nan Knuteson, Membership Coordinator and Registrar; Kathy Kuehn, Production Director; Merriann Carey, Graphic Designer; Erica Koconis, Accountant; and Bill Stoeffler, Account Director.



General Information

OFFICERS OF THE SOCIETY

Chair	Laura Carlson,
	University of Notre Dame, USA
Past Chair	John Dunlosky,
	Kent State University, USA
Chair-Elect	James Pomerantz, Rice University, USA
Secretary	R. Reed Hunt,
	University of Mississippi, USA
Treasurer	Marianne Lloyd,
	Seton Hall University, USA
Executive	Louis Shomette, Psychonomic Society
Director	

2019 GOVERNING BOARD

- Edward Awh, University of Chicago, USA
- Marc Brysbaert, Ghent University, Belgium
- Laura Carlson, University of Notre Dame, USA
- John Dunlosky, Kent State University, USA
- Fernanda Ferreira, University of California, Davis, USA
- Angela Gutchess, Brandeis University, USA
- Michael J. Kane, University of North Carolina, Greensboro, USA
- Penny M. Pexman, University of Calgary, Canada
- James Pomerantz, Rice University, USA
- Patricia Reuter-Lorenz, University of Michigan, USA
- Valerie Reyna, Cornell University, USA
- Duane Watson, Vanderbilt University, USA
- R. Reed Hunt, University of Mississippi, ex officio, USA
- Marianne Lloyd, Seton Hall University, ex officio, USA
- Louis Shomette, Executive Director, ex officio

PSYCHONOMIC SOCIETY STATEMENT ON HARASSMENT

The Psychonomic Society is an inclusive and welcoming organization. Our annual and affiliate meetings, and our professional communications, should reflect those values. Society members, conference attendees, and digital event participants should enjoy freedom of speech, freedom of thought, and freedom from harassment and discrimination of all kinds. We encourage members to be mindful of others' perspectives and to consider how a question, comment, or invitation might be received particularly when there is a power differential between parties. Constructive criticism is an essential part of science. No participant should feel vulnerable to harassment or discrimination, nor should they endure a climate of fear or hostility, at our meetings or in our digital events. Let's all work together to ensure that our values of inclusion, respect, and professionalism are ones that are enjoyed by all of our members and event participants.

Respectfully submitted by R. Reed Hunt, Secretary Adjunct Research Professor, University of Mississippi reed@olemiss.edu

PALAIS DES CONGRÈS DE MONTRÉAL (MONTREAL CONVENTION CENTRE): LEVEL 5



FOOD AND BEVERAGE OPTIONS AT THE CONVENTION CENTER (SUBJECT TO CHANGE)

- 3 Amigos Mexican
- Basha Palais Middle Eastern specialties in a cafeteria-style chain outfit.
- Noobox Chinese Takeout
- Sushi Shop Sushi and Poke
- Terra Verde halal options preparing healthconscious sandwiches & salads.
- La Popessa Italian
- Press Café Breakfast, sandwiches and salads
- Subway Breakfast, sandwiches and salads



AFFILIATE MEETINGS

Auditory Perception, Cognition, and Action Meeting (APCAM)

18th Annual Meeting

Thursday, November 14, 2019 8:30 a.m.-5:30 p.m. (registration opens at 8:00 a.m.) Room 519A Website: https://apcsociety.org/

Comparative Cognition Society

Not meeting in 2019 Website: http://comparativecognition.org/

Configural Processing Consortium (CPC)

Wednesday, November 13, 2019 8:00 a.m.-4:00 p.m. Room 514B Website: www.configural.org

Culture and Cognition Inaugural Meeting

Th ursday, November 14, 2019 9:00 a.m.-3:00 p.m. Room 523A Website: https://www.brandeis.edu/gutchess/ culture-and-cognition-preconference/index.html

Object Perception, Attention, and Memory (OPAM) 27th Annual Workshop

Thursday, November 14, 2019 7:00 a.m.-5:00 p.m. Rooms 524A-C Website: www.opam.net

Society for Computers in Psychology (SCiP) 49th Annual Meeting

Thursday, November 14, 2019 7:30 a.m.-6:00 p.m. Rooms 518A-C Website: www.scip.ws

Society for Judgment and Decision Making (SJDM) 40th Annual Conference Friday, November 15 – Monday, November 18, 2019 Multiple Rooms on Level 5

Society for Mathematical Psychology (SMP) 6th Annual Symposium on Computational Approaches to Cognition

Thursday, November 14, 2019 9:00 a.m.-5:00 p.m. Room 516A Website: www.mathpsych.org

Website: www.sjdm.org

SPARK Society

2nd Annual Meeting Thursday, November 14, 2019 2:30 p.m.-4:00 p.m. Room 514B Website: https://www.sparksociety.org/

Tactile Research Group (TRG) Annual Meeting

Thursday, November 14, 2019 9:00 a.m.-5:00 p.m. Room 514A Website: http://trg.objectis.net

Women in Cognitive Science (WiCS) 19th Annual Meeting

Thursday, November 14, 2019 4:00 p.m.-7:00 p.m. Room 516C Website: http://womenincogsci.org/meetings

Rooms subject to change.

PSYCHONOMIC SOCIETY JOURNALS



The Psychonomic Society publishes seven highly respected, peer-reviewed journals covering all aspects of cognitive and experimental psychology. Select a Psychonomic Society journal to showcase your science and to ensure that your research delivers the maximum impact to the global scientific community. Members receive free online access to all seven Psychonomic Society journals. *https://www.psychonomic.org/page/journals*



Congratulations to the Inaugural 2019 Clifford T. Morgan Distinguished Leadership Award Recipients

The Psychonomic Society is pleased to announce the inaugural recipients of our new Distinguished Leadership Award: Mary Peterson, Suparna Rajaram, and Brian Ross. The recipients will be honored at the business meeting on Saturday, November 16, during the Psychonomic Society's 2019 Annual Meeting in Montréal, Québec, Canada.



Mary Peterson University of Arizona



Suparna Rajaram Stony Brook University, SUNY



Brian H. Ross Minerva Schools at KGI

By 2008, the Psychonomic Society was in poor financial shape caused by multiple years of financial losses stemming from reduced journal subscriptions, escalating printing and labors costs, and a poor U.S. economy. There was great uncertainty about how the Society might be resilient to changes in the field and to what would best enable us to go forward. It was the leadership of a series of Governing Board chairs of the Society that created the foundation for our current success. Notably, despite the corrective action these leaders initiated, there was minimal disruption to our ongoing programming, so that many of our members were completely unaware of the magnitude of effort and wisdom they supplied.

The most important step they took was to change the society's publishing program from one of selfpublishing to partnering with a major scientific publisher. With the help of Lawrence Erlbaum (Lawrence Erlbaum Associates) and Alan G. Kraut (Association for Psychological Science), Suparna (2008 GB chair), Mary (2009 GB chair), and Brian (2010 GB chair) engaged Donald J. Foss (University of Houston) to prepare a comprehensive Request for Proposals (RFP) and sent our journal publishing program out for tender.

The RFP led to multiple proposals by most of the major publishers and resulted in a 10-year agreement with Springer, which set the society on firm financial footing for many years to come.

Mary, Suparna, and Brian were models of leadership. We owe them an enormous debt of gratitude, and we are pleased to honor them with the society's inaugural Distinguished Leadership Award.

For more about Clifford T. Morgan and the Distinguished Leadership Award, go to https://www.psychonomic. org/page/leadershipaward The Psychonomic Society Announces the Recipients of the

2019 MID-CAREER AWARD



The Mid-Psychonomic Society Career Award is given for exceptional contributions to the field of experimental and cognitive psychology and related areas by an individual who is currently in the middle of their career. The purpose is to raise the visibility of our science and of our very best mid-career scientists within the field, within the awardees' institutions, in the press, and in the larger community. Many universities are carefully scrutinizing departments and programs in deciding upon the deployment of limited resources, and among the most important criteria are those that indicate academic and scientific quality. Recipients will be recognized at the Business, Awards, and Happy 60th Birthday Champagne Celebration in Room 524A, Level 5, on Saturday, November 16, 2019, at 5:10 p.m.

2019 Awards Committee:

Angela Gutchess, chair; Michael J. Kane, Tania Lombrozo, Valerie Reyna, Evan Risko, and Jessica Witt.





Michael Anderson

University of Cambridge, United Kingdom

Michael C. Anderson is a Senior Scientist and Programme Leader at the MRC Cognition and Brain Sciences Unit at the University of Cambridge. Anderson is a fellow of the Psychonomic Society and served on the Society's Governing Board (2009-2015). Anderson is also a fellow of the Association for Psychological Science and of the Society for Experimental Psychologists (2018), and is actively involved in the Cognitive Neuroscience and Memory Disorders Research Societies. His work on motivated and adaptive forgetting has had a broad impact on research in the diverse subfields of psychology, while also receiving significant interest from the popular media, including coverage by NPR, PBS, New York Times, Scientific American, Wall Street Journal, CNN, Newsweek, BBC, Time Magazine, Forbes, and numerous international outlets. Anderson's research focuses on fundamental mechanisms of memory, attention, and cognitive control, and their interaction.

Kathleen McDermott

Washington University in St. Louis, USA

Kathleen B. McDermott is Professor of Psychological & Brain Sciences at Washington University in St. Louis. She received a BA in Psychology from the University of Notre Dame in 1990 and a PhD in Psychology from Rice University in 1996. She then went to Washington University in St. Louis for a postdoctoral fellowship in cognitive neuroscience. She was appointed research assistant professor in 1998 before going on the tenure-track in 2001. She was promoted to associate professor in 2006 and then full professor in 2011. Her research focuses on human memory. Her lab uses the traditional behavioral techniques of psychology complemented by functional MRI in studying memory and its interactions with other cognitive processes (e.g., perception, imagery, language).

Klaus Oberauer

University of Zurich, Switzerland

Klaus Oberauer studied Psychology at the Free University Berlin and earned his doctoral degree (Dr. phil) at University of Heidelberg in 1995. He has held research positions at the University of Mannheim (1994-1997) and the University of Potsdam (1997-2005), and was appointed as Professor of Psychology at University of Bristol in 2005. He is currently Professor of Cognitive Psychology at the University of Zurich (since 2009). His research interests include working memory, reasoning, and capacity limits of cognition. He investigates these topics through behavioral experiments, studies of individual and age differences, and computational modeling.

2019 Early Career Awards

The Psychonomic Society Announces the Recipients of the

2019 EARLY CAREER AWARD

The Psychonomic Society Early Career Award recognizes exceptional research accomplishments among our members. Nominees must have completed their terminal degree (typically PhD) within the last 10 years and must be a Fellow or Member of the Society. Nominations are made by members of the Society, and each candidate must be endorsed by two members.

Up to four awards can be made each year. One nominee, whose research is closest to the areas of perception and attention, will receive the Steven Yantis Early Career Award. Selection of the awards is made by a committee consisting of members of the Governing Board and other members of the Society. Recipients will be recognized at the Business, Awards, and Happy 60th Birthday Champagne Celebration in Room 524A, Level 5, on Saturday, November 16, 2019, at 5:10 p.m.

2019 Awards Committee:

Angela Gutchess, chair; Michael J. Kane, Tania Lombrozo, Valerie Reyna, Evan Risko, and Jessica Witt.



Brian Anderson Texas A&M University, USA

Brian Anderson's research investigates the ways in which the control of attention is shaped by learning history, using both behavioral psychophysics and functional neuroimaging methodologies. His research has played a pivotal role in establishing a novel mechanism of attentional control by which reward learning causes a stimulus to become attentiongrabbing, which he has termed "value-driven attention." The focus of his research has subsequently expanded to encompass

the influence of aversive conditioning and outcomeindependent selection history on the control of attention as well. The attentional processes Brian studies have implications for our understanding of addiction, and his work is currently supported by the National Institute on Drug Abuse (NIDA).



Timothy Brady

University of California, San Diego, USA

Timothy Brady's research focuses on perception, visual working memory, and visual long-term memory, using a combination of behavioral and computational methods to understand the limits on our ability to encode and maintain visual information. Questions asked by his lab include: What constraints do visual processing and prior knowledge impose on information encoding? How do visual representations transform from perception to working memory to long-term memory? How do we store information about items that are

strongly related to other items or to the context? Broadly, his work argues that we should understand memory as dealing not with individual items but structured representations that are hierarchical and dependent on existing knowledge.



Heather Ferguson University of Kent, United Kingdom

Heather Ferguson completed her MA in Psychology, MSc in Research Methods for Psychological Science, and a PhD (Comprehending Counterfactuals) at the University of Glasgow in 2007. Following two years as a postdoctoral researcher at University College London, she joined the University of Kent's School of Psychology as a Lecturer in 2009. Her primary research interest is in Cognitive Psychology. She is particularly interested in the interface between cognitive processes and social interaction,

specifically the way that we access and represent other people's perspectives during communication. She uses a variety of techniques, including eye movements, event-related brain potentials, and reaction times.



Brandon Turner

The Ohio State University, USA

Brandon M. Turner is an Assistant Professor in the Psychology Department at The Ohio State University. He received a BS from Missouri State University in mathematics and psychology in 2008, a MAS from The Ohio State University in statistics in 2010, and a PhD from The Ohio State University in 2011. He then spent one year as a postdoctoral researcher at University of California, Irvine, and two years as a postdoctoral fellow at Stanford University. His research interests include dynamic models of cognition

and perceptual decision making, cognitive control, efficient methods for performing likelihood-free and likelihood-informed Bayesian inference, and unifying behavioral and neural explanations of cognition. The Psychonomic Society Announces the Recipients of the



The Psychonomic Society Program Committee selected 18 Graduate Travel Awards based on the quality of the abstracts submitted by Student Members of the Society for the 2019 Annual Meeting in Montréal, Québec, Canada.

Each recipient receives a travel stipend of \$1,000 USD and will be recognized at the Business, Awards, and Happy $60^{\rm th}$ Birthday Champagne Celebration in Room 524A, Level 5, on Saturday, November 16, 2019, at 5:10 p.m.

2019 Program Committee: Duane Watson, chair; Edward Awh, Marc Brysbaert, Kimberly Fenn, Angela Gutchess, Stephen Mitroff, and R. Reed Hunt.

 $Please \ join \ the \ Program \ Committee \ in \ congratulating \ these \ recipients. \ Visit \ www.psychonomic.org/page/awards \ for \ more \ information.$



Andra Arnicane University of Zurich, Switzerland Abstract #3040: What Constrains Attention to Visual Features in Working Memory?



Christopher Draheim Georgia Institute of Technology, USA Abstract #1036: Attention Control is a Unitary Concept when Measured with Accuracy-Based Tasks



Katherine McNeely-White Colorado State University, USA Abstract #1155: Haven't I Heard This Before? The Mechanism and Bias of Déjà Entendu



Ralph Redden Dalhousie University, Canada Abstract #1012: Is Inhibition of Return at the Midpoint of Simultaneous Cues Input-Based or Output-Based?



Junha Chang University of Massachusetts, Amherst, USA Abstract #2039: Experience with Difficult Dual-Color Search Can Promote a Shift o a Single Range Target Representation



Tino Endres Albert-Ludwigs-University Freiburg, Germany Abstract #4154: Constructive Retrieval by Prompted Recall: Exploiting the Benefits of Retrieval Practice and Elaboration



Sarah Myers Colorado State University, USA Abstract #4153: Testing Effects for Self-Generated Versus Experimenter-Generated Ouestions



Michelle Rivers Kent State University, USA Abstract #1128: Learners Require Considerable Support to Learn from Experience about the Benefits of Testing



Elizabeth Wiemers Purdue University, USA Abstract #4061: Action Video GameTraining Produces Near Transfer Only



Elizabeth Clancy University of Guelph, Canada Abstract #1168: Stimulus Devaluation is a Consequence of Cognitive Inhibition, not a mere Reflection of Conflict: Evidence from Task-switching



Eitan Hemed University of Haifa, Israel Abstract #2114: Evaluation of an Action's Effectiveness by the Motor System in a Dynamic Environment



Orit Nafcha University of Haifa, Israel Abstract #2003: Exploring the Sociality of the Archerfish



Ty Tang Arizona State University, USA Abstract #3012: Egocentric Temporal Order Bias: How Vantage Shapes Perceptual Experience



Cindy Xiong Northwestern University, USA Abstract #3024: Same Data, Diverging Conclusions: Perceptual Salience Drives Data Interpretation



Abhishek Dey Washington University in St. Louis, USA Abstract #3019: Looking to the Past when Engaging Control in the Present



Peter Krause University of California, Santa Cruz, USA Abstract #2124: Nuclear Vowel Priming and Anticipatory Oral Postures: Evidence for Parallel Phonological Planning?



Phillip Newman Vanderbilt University, USA Abstract #1157: Bayesian Integration of Visual Landmark Cues During Navigation



Yonatan Vanunu University of New South Wales, Australia Abstract #1073: Elucidating the Differential Impact of Extreme Information in Perceptual and Preferential Choice

The Psychonomic Society Announces the Recipients of the

2019 J. FRANK YATES STUDENT TRAVEL SUPPORTING DIVERSITY & INCLUSION IN COGNITIVE PSYCHOLOGY

AWARI



Alesha Bond Georgia State University, USA Abstract #1066: Who's to Blame: Working Memory, Cognitive Load, and Victim Race



Cristina Ceja Northwestern University, USA *Abstract #3046: Visual Imagination Shares Similar Capacity Limits with Visual Working Memory*



Nafiseh Faghihi Texas A&M University, USA Abstract #4123: A Rightward Directional Bias for Event Depiction in Representational Drawings



Krystal Kamekona-Mendoza University of Nevada, Las Vegas, USA *Abstract #4081: Novice Versus Expert Algebraic Problem-Solving Strategies: An Eye Tracking Approach*



Emily Martinez Villanova University, USA Abstract #2146: Electrophysiological Measures of Speech Sound Encoding in Background Noise Reflect Accuracy and Self-Reported Hearing Difficulty



Mercedes Villalonga Brandeis University, USA *Abstract #3095: Feeling (and Seeing) the Beat: Vibrotactile, Visual, and Bimodal Rate Perception*

The Psychonomic Society Diversity & Inclusion Committee selected six J. Frank Yates Student Travel Awards based on the quality of the abstracts submitted by Graduate Student Members of the Society for the 2019 Annual Meeting in Montréal, Québec, Canada. Each recipient receives a travel stipend of \$1,000 USD and will be recognized at the Business, Awards, and Happy 60th Birthday Champagne Celebration in Room 524A, Level 5, on Saturday, November 16, 2019, at 5:10 p.m.

Diversity and Inclusion Committee: Valerie Reyna, chair; Ivy Defoe, Jean Fox Tree, Angela Gutchess, Alejandro Lleras, and Travis Seymour.

Please join the Diversity & Inclusion Committee in congratulating these recipients. Visit www.psychonomic.org/ awards for more information.

2019 BEST ARTICLE AWARD RECIPIENTS

Sponsored by Springer

The Psychonomic Society Best Article Award recognizes the best article published in each of the Psychonomic Society's journals in 2019. Selections are made by the editorial team of each journal. Award recipients (the lead author) will receive a certificate and honorarium of \$1,000 USD and will be recognized at the Business, Awards, and Happy 60th Birthday Champagne Celebration in Room 524A, Level 5, on Saturday, November 16, 2019, at 5:10 p.m.



Psychonomic Society 2019 SPECIAL EVENTS

Lunchtime Workshop: Encouraging Future Scientists: Supporting Undergraduates at Psychonomics (UP)

Organizers: Jen Coane (co-chair), Colby College; Sharda Umanath (co-chair), Claremont McKenna College; Nate Kornell, Williams College; Katherine White, Rhodes College; Brooke Lea, Macalester College; Ruthann Thomas, Simmons University

Friday, November 15 12:00 p.m.-1:30 p.m.

Room 519A

Current undergraduate and graduate students are the future of the Psychonomic Society. The goal of this lunchtime workshop is to welcome talented young scientists to Psychonomics, provide them with some tips for preparing and applying to graduate programs in psychology, and encourage them to network with one another and more senior scientists. 12:00: Welcome & Introductions. 12:05: "Psychonomics 101" orientation - *brief overview of conference and networking opportunities*. 12:15: Graduate Path Advising Panel: Suparna Rajaram (Stony Brook University), Andrew Conway (Claremont Graduate University), and Priti Shah (University of Michigan). *Each speaker will provide a brief presentation on how to identify potential mentors and programs, how to prepare a strong application for graduate programs, and how to make informed choices on where to go and how to succeed. A Q & A period will follow. 1:00: Networking time - Launch will include pointing out tips and tricks for networking at the conference and how to make those interactions meaningful. Current graduate students and faculty who mentor graduate students, especially those who are actively recruiting are invited. Also invited are attendees at various stages in their careers from graduate students to senior faculty to those outside academia who went to primarily undergraduate institutions.*

Lunchtime Workshop: Hacking Your Mind - A new 4 Hour PBS Series on behavioral psychology

Organizer: Carl Byker, Writer, Producer, Director: "Hacking Your Mind"

Friday, November 15 12:00 p.m.-1:30 p.m. *Room 524A-B*

Carl will be screening and discussing clips from "Hacking Your Mind" featuring Mahzarin Banaji, Laurie Santos, Jennifer Eberhardt, Yarrow Dunham, Jennifer Richeson, Robert Cialdini and Nicholas Christakis. The series was funded by a major grant from The National Science Foundation and will air nationwide on PBS in primetime in July of 2020.

Lunchtime Workshop: Information Session: Funding at the National Science Foundation

Organizer/Speaker: Betty Tuller, PhD, Director, Perception, Action, and Cognition Program, National Science Foundation

Saturday, November 16 12:00 p.m.-1:30 p.m.

Room 521A-B

NSF opportunities change all the time! Come hear the latest and get your questions answered. This presentation and Q&A session will provide information on current funding opportunities relevant to the Psychonomics community, NSF merit criteria, and the review process. Program officers will discuss. We will also cover 1) how to find the appropriate program for your work and 2) how to apply for National Science Foundation (NSF) funding, and 3) the grant-writing process and tips for writing successful proposals. Program Directors will also be available to schedule one-on-one meetings, to discuss specifics of your research and how to get it funded.

Lunchtime Workshop: Workshop on Non-academic Careers for Psychologists

Chaired by Robert Rauschenberger, Exponent, Inc.

Saturday, November 16 12:00 p.m.-1:30 p.m. *Room 519A*

The present workshop will essay to provide an unbiased look at the obstacles psychologists face in transitioning out of academic research, and offer some advice from those who have successfully made the transition, on how to overcome those impediments. A panel comprising former academic psychologists now working in user experience, on defense contracts, and in the gaming industry will share their personal experiences and then make themselves available for questions from the audience. An introductory presentation will talk about how to identify and apply for suitable non-academic positions.

Psychonomic Society 2019 SPECIAL EVENTS

Diversity & Inclusion Reception

Supported by the Psychonomic Society Diversity & Inclusion Committee Friday, November 15, 4:30 p.m.-5:30 p.m.

Room 524C, Level 5

As the preeminent society for the experimental study of cognition, the Psychonomic Society celebrates scientific merit and the diversity of researchers in the field and the Society. Please join members of the Governing Board and the Diversity & Inclusion Committee for a wine and cheese reception open to all scientists, including graduate students, early- and mid-career investigators, and senior researchers.

Graduate Student Social

Supported by the Psychonomic Society Friday, November 15, 9:00 p.m.-12:00 a.m. *Pub St-Paul, 124 St. Paul St E, Montreal, Quebec H2Y 1G6, Canada, +1-514-874-0485*

Kick back and relax as you meet other graduate students at Pub St-Paul. Light hors d'oeuvres and one drink ticket good for beer, wine, liquor, soda, or water will be handed out per person (limited availability). Bring appropriate ID and PS name badge.

Jogonomics

Supported by the Psychonomic Society Saturday, November 16, 6:00 a.m. *Palais des congrés de Montréal, Lobby closest to Le Westin and InterContinental entrance*

Join your fellow Psychonomes on a 5k or 5-mile run. You choose a distance that works best for you. Release required.

Business, Awards, and Happy 60th Birthday Champagne Celebration

Saturday, November 16, 5:10 p.m. Palais des congrés de Montréal, Room 524A

New this year, all Psychonomic Society Awards will be presented at the Society's business meeting. This includes:

- Clifford T. Morgan Distinguished Leadership Award
- Mid-Career Award
- Early Career Award
- J. Frank Yates Student Travel Award
- Best Article Award
- Graduate Travel Award
- Psychonomic Society/Women in Cognitive Science Travel and Network Award for Junior Scientists

60th Anniversary Celebration

Saturday, November 16, 6:30 p.m., (immediately following the **Business, Awards, and Happy 60th Birthday Champagne Celebration**)

Palais des congrés de Montréal, Level 5 Foyer

Enjoy a piece of cake in a celebration of the Psychonomic Society's 60th anniversary. The Psychonomic Society was founded by a group of experimental psychologists during a meeting in Chicago, Illinois, in December 1959 and incorporated on March 31, 1960, in Wisconsin, USA. The main goal was to create a society that would support open communication about psychological science with minimal structure.

IN MEMORIAM Psychonomic Society Members July 1, 2018 - July 1, 2019

Robert Fox (1932-2018)

Robert Fox, Professor of Psychology at Vanderbilt University for over half a century, died December 12, 2018, after a short illness. He was 86. Bob received his PhD from the University of Cincinnati in 1963 and then began his long association with Vanderbilt where he studied and taught until his retirement in 2012. Bob is recognized for his landmark studies of animal vision and human vision, both infant and adult. He is perhaps best known for his foundational work on binocular rivalry, with a series of landmark papers in the 60's and 70's that sparked interest in rivalry within vision science. He was a founding member of the Vanderbilt Vision Research Center, and over the decades trained a host of graduate students who themselves went on to productive careers. The Department honored his legacy by endowing an award in his name given annually to a post-graduate researcher in the Department. • *written by Randolph Blake*

David S. Gorfein (1935-2018)

David Gorfein passed away on July 31st at the age of 83. A native New Yorker, Dave earned his PhD from Columbia University while supporting himself teaching in Montana and Utah and mailing dissertation pages home for his mother to type. His 60-year career included positions at New College, Adelphi University, and University of Texas. He started out as a social psychologist but soon became interested in short-term memory. His research on homographs culminated in the development of his activation selection model for resolving semantic ambiguity. He loved attending Psychonomics and discussing research with all his friends. Dave will be remembered for his sense of humor, his generosity toward undergraduate and graduate students, his talent for creating community, and his ability to find puns everywhere. A life-long Yankees fan, he is survived by his wife Julia and sons Will and Aaron. • *written by Andrea Bubka and Stephanie A. Berger*

Allan R. Wagner (1934-2018)

Allan Wagner died peacefully at home with his family on September 28, 2018, at age 84 after recurrence of brain cancer. Allan arrived at the Institute of Human Relations, which housed Yale's Psychology Department, fresh from Iowa's cornfields and Kenneth Spence's tutelage. He fit right in with neo-behaviorists Neal Miller and Frank Logan. As the cognitive revolution began in the late 60's, he and Bob Rescorla collaborated to revolutionize the study of association formation in classical conditioning with the Rescorla-Wagner model. Allan remained an influential theorist and experimentalist. His accomplishments were recognized with awards including the Howard Crosby Warren Medal of the Society of Experimental Psychologists (1991), election to the National Academy of Sciences (1992), and the APA Award for Distinguished Scientific Contributions (1999). He served as the founding editor of JEP: Animal Behavior Processes (now Animal Learning and Cognition) as well as associate editor for several other journals. • *written by J. W. (Bill) Whitlow, Jr.*

Bruce W. A. Whittlesea (1950-2018)

Bruce Whitelesea passed away on July 11, 2018 in Freiburg im Breisgau, Germany. After completing his PhD under the supervision of Lee Brooks at McMaster University, Bruce briefly held faculty positions at Carleton University and at Mount Allison University. He then spent 20 years at Simon Fraser University, retiring in 2009. Bruce considered himself a scientist of the mind and of all that minds can do, and he pursued his science with passion and creativity. It was his fervent conviction that representations of experiences in memory, in dynamic interaction with the current environment, were the sole driving force behind all thought, behavior, and feeling states. He proposed that memory served two functions: production (generation of thoughts, feelings, and actions) and evaluation (causal inferences about what happens during acts of production), which he articulated in a framework called the SCAPE (Selective Construction and Preservation of Experience) account of memory. • *written by Jason Leboe-McGowan*

James Craig Bartlett (1948-2019)

Jim Bartlett died in Dallas, Texas, USA, on June 1, 2019, after undergoing treatment for cancer. Born in Newark, New Jersey, Jim received his undergraduate degree magna cum laude and Phi Beta Kappa from the University of Texas, Austin, in 1970 and his PhD in Psychology from Yale in 1975. He then joined the faculty at UT Dallas, where he remained his entire career and produced 16 PhDs. He rose up through the ranks to an endowed professorship, serving in many key positions including Interim Dean of the School of Behavioral and Brain Sciences, which is now naming a new professorship after him. Jim's research interests were wide-ranging. He was a major figure in the study of holistic configurations across the age span, including the perception of faces, places, objects, and melodies. His work has also had implications for applied problems such as eyewitness testimony. • *written by James Pomerantz*

Alan Raymond Scoboria (1972-2019)

Alan Scoboria passed away from brain cancer April 12, 2019, age 46. An applied memory researcher with strong interest in theory, he produced an impressive body of research exploring the cognitive and social processes that contribute to people's beliefs and memories of their personal past, and examining best practices in interviewing cooperative eyewitnesses. Alan completed his doctorate in clinical psychology at University of Connecticut in 2004, and taught at University of Windsor for 15 years. In his too-short career, he published over 50 research articles, many with collaborators from around the world. He served as an Associate Editor for *Applied Cognitive Psychology* for five years. He is survived by his wife Myrna and their two daughters, whom he loved dearly, and is mourned by a community of scholars who will miss his thought-provoking ideas, his kind and open nature, and his love of a good meal. • *written by Linda Henkel, Giuliana Mazzoni, Amina Memon*

To read the obituaries of the members above, please visit our website at www.psychonomic.org/obituaries. The Psychonomic Society would like to honor members by listing obituaries on its website. If you know of a member of our community who has recently passed away, please contact Colin MacLeod at cmacleod@uwaterloo.ca with information.



Thursday, November 14, 2019 Room 519A 8:00 am - 5:00 pm

Featuring Keynote address by Dr. Isabelle Peretz, University of Montréal

The goal of **APCAM** is to bring together researchers from various theoretical perspectives to present focused research on auditory cognition, perception, and aurally guided action. APCAM is a unique meeting in its broad inclusion of basic and applied research that targets multiple levels of processing, theoretical perspectives, and methodologies. **Organizing Committee**

Timothy Hubbard (Chair) Laura Getz (Co-chair) Devin McAuley Kristopher Patten Peter Pfordresher Julia Strand

APCAM is supported in part by the Auditory Perception and Cognition Society. Accepted abstracts will receive consideration for invitation to submit a manuscript for the following year's annual issue of *Auditory Perception & Cognition* highlighting work from APCAM.

Visit www.apcsociety.org for more details

PALAIS DES CONGRES DE MONTREAL Montréal, Québec, Canada



Configural Processing Consortium

www.configural.org

Wednesday, November 13, 2019 8:30 a.m. - 5:30 p.m. Room 514B

The Configural Processing Consortium (CPC) is an annual workshop bringing together researchers in configural processing. We aim to tackle deep issues underpinning perceptual organization, cognition, and action, as well as the most cutting edge theoretical and experimental research on configural topics. Although vision typically dominates, our interests include all modalities.

Each year, we seek to both define the major problems underlying the field of configural processing and to develop more unified ways of approaching these problems.

Organizing Committee

Mary Peterson (President 2016-2019) Karen Schloss (Secretary/Treasurer) Frédéric Gosselin (Local Host)

Leslie Blaha, Ami Eidels, Mario Fific, Joseph Houpt, Ruth Kimchi, James Pomerantz, James Townsend, Cheng-Ta Yang

Support



Contact: Karen Schloss (kschloss@wisc.edu)

Inaugural Culture and Cognition Preconference of the Psychonomic Society



Invited Speakers

Featured Presentation: James R. Pomerantz, Rice University

Caroline Blais, Université du Québec en Outaouais Aysecan Boduroglu, Boğaziçi University Daniel Casasanto, Cornell University Audrey Duarte, Georgia Institute of Technology Angela Gutchess, Brandeis University Lorraine Hope, University of Portsmouth Suparna Rajaram, Stony Brook University Lixia Yang, Ryerson University

Abstract submissions are invited.

Trainee and works in progress poster submissions are encouraged. We will follow up those registered to invite poster submissions for a later deadline. Depending on the submissions received, a data blitz session may be developed.

Due to limited space, advanced registration is required. For more information and to register, please visit: https://www.brandeis.edu/gutchess/culture-and-cognition-preconference/index.html

Founded and Organized by Suparna Rajaram, Stony Brook University Angela Gutchess, Brandeis University

Student Organizers

Raeya Maswood, Stony Brook University Wanbing Zhang, Brandeis University

This meeting is made possible through support from the Psychonomic Society.



Thursday, November 14, 2019 Palais des Congrès de Montréal Room 524 A-C 7:30 am to 5:00 pm Keynote address by Dr. Melissa Le-Hoa Võ

2019 Organizers:

Yelda Semizer Stephen Walenchok Patrick Cox Deborah Cronin





The 49th Annual Meeting of the Society for Computers in Psychology

Thursday, November 14, 2019, 9am – 6pm Convention and Exhibition Centre Palais des congrès de Montréal

About SCiP

SCiP has a long tradition of advancing and disseminating new *analytic and computational methods* in the service of core psychological research.

The theme for this year's conference is "The Fluid Mind." The theme emphasizes the importance of new methods for exploring *change*: dynamics, learning, memory formation, and so on.

Keynote:

Dr. Nia Amazeen Arizona State University

President's symposium:

Dr. Laura Allen New Hampshire University

Dr. Rick Dale University of California, Los Angeles

Dr. Michael Jones Indiana University

For more information, visit: www.scip.ws



Society for Judgment and Decision Making

November 15-18, 2019 at the Palais des congrès de Montréal (Montreal Convention Centre) Québec, Canada

On-site registration November 15th at 5.00 p.m. 5th Floor (Foyer at 516)

The Society for Judgment and Decision Making is an interdisciplinary academic organization dedicated to the study of normative, descriptive, and prescriptive theories of judgments and decisions. Its members include psychologists, economists, organizational researchers, decision analysts, and other decision researchers. The Society's primary event is its Annual Meeting, at which Society members present their research. It also publishes the journal Judgment and Decision Making.

For more information, including registration fees and timetable, see www.sjdm.org





Hosts:Clintin Davis-Stober & Timothy J. PleskacDate:Thursday, November 14, 2019Time:9:00 a.m. to 3:30 pmLocation:516A

The Society for Mathematical Psychology promotes the advancement and communication of research in mathematical psychology and related disciplines. Mathematical psychology is broadly defined to include work of a theoretical character that uses mathematical methods, formal logic, or computer simulation. The day long symposium will showcase the latest theoretical and modeling advances spanning a broad range of topics, including: perception, memory, decision making, and methodology. The symposium will consist of a set of invited presentations, a poster session, and an unconference session. What is an unconference? Come find out because we aren't sure either, but we promise it will be different, that you will learn something, and that by participating you will have the opportunity to help advance your own research and the field of mathematical psychology.

For more information, email stoberc@missouri.edu or pleskac@ku.edu.

All are welcome!



Date: Thursday, November 13th, 2019

Time: 2:30 p.m. - 4:00 p.m.

Location: Palais des Congrés de Montréal, Room: 514B

Panelists: Dr. Jackie Dejean - Tufts University Dr. Natasha Tokowicz - University of Pittsburgh Brandon Carlos - University of Houston Alexandria Weaver - University of California Irvine

A critical issue in the field of Cognitive Psychology is its lack of racial diversity. Recently, internship and post-baccalaureate programs have been developed that target students of African, Latinx, and Indigenous heritage. This panel will focus on tools and strategies for successfully implementing an internship program aimed at racial diversity.

For more information, email sparkcognitivescience@gmail.com



Join us for our annual meeting to be held on **Thursday, November 14, 2019** Palais des congrès de Montréal Room 514B, 5th Floor from 9 a.m. to 5 p.m.

From its humble beginning as a handful of colleagues sitting on beds in a hotel room discussing research on the perception of touch, the TRG has become an international collection of over 100 people conducting research on a wide variety topics related to tactile perception. Our members come from both academia and industry and span a wide range of exciting topics including tactile acuity in the blind, haptic interfaces for driving and aviation, simulation of object texture in VR, sensory integration, synesthesia and haptic space perception.

The purpose of the TRG is to facilitate interaction between tactile researchers and to provide a venue to share new research findings. This is primarily achieved through the TRG annual meeting held in conjunction with the meeting of the Psychonomic Society.

Your organizers,

Brendan Stanley and Kaian Unwalla

For more information or to be added to our mailing list, email: tactileresearchgroup@gmail.com



The 19th Annual Meeting of Women in Cognitive Science

Thursday, November 14, 2019 Panel and Q&A: 4-6 pm, Room 516C Speed Mentoring & Social Hour: 6-7 pm, Room 516D

Creating a Healthy Work Environment

Workshop Introduction:

Laurie Feldman, The University at Albany

Panelists:

Fernando T. Maestre, University of Alicante & Rey Juan Carlos University Kristi Multhaup, Davidson College Jelena Ristic, McGill University Lisa Scott, University of Florida Betty Tuller, The National Science Foundation

Panel Moderator:

Debra Titone, McGill University

Speed Mentoring Session Co-organizers:

Natasha Tokowicz, University of Pittsburgh Eleonora Rossi, University of Florida Sharda Umanath, Claremont McKenna College

WiCS Co-organizers:

Suparna Rajaram, Stony Brook University Judith Kroll, University of California, Irvine Laurie Feldman, The University at Albany Natasha Tokowicz, University of Pittsburgh

Find us on: http://www.womenincogsci.org/ Twitter @WomenInCogSci https://www.facebook.com/WomenInCognitiveScience/

Women in Cognitive Science is affiliated with the Psychonomic Society and its activities are funded by the Perception Action and Cognition program at the National Science Foundation.

THURSDAY EVENING, NOVEMBER 14, 2019

Automatic Processing (1001-1012) Attentional Control I (1013-1026) Attention and Individual Differences (1027-1036) Cognitive Control I (1037-1051) Working Memory I (1052-1067) Decision Making I (1068-1087) Language Production and Writing I (1088-1098)

(Author present between 6:00 PM-7:30 PM)

> Letter/Word Processing I (1099-1115) Human Learning and Instruction I (1116-1129) Recognition Memory I (1130-1143) Recall I (1144-1155) Spatial Memory (1156-1165) Emotion and Cognition I (1166-1179)

FRIDAY MORNING, NOVEMBER 15, 2019

Cognitive Aging (1-5)	
Attention Capture (6-11)	8:00 AM-10:00 AM 520 B
Psycholinguistics (12-17)	8:00 AM-10:00 AM 520 F
Reward, Motivation, and Decision Making (18-23)	8:00 AM-10:00 AM 519 B
Eyewitness Identification (24-28)	
Perception and Action (29-33)	
Symposium I: What Memory Quirks, Hiccups and Odd Phenomena Tell Us (34-39)	10:00 AM-12:00 PM 517 D
Visual Working Memory (49-54)	
Cognitive Control I (60-65)	
Letter/Word Processing: Individual and Cultural Differences (40-44)	10:20 AM-12:00 PM 520 B
Associative Learning (45-48)	
Bilingual Production (55-59)	10:20 AM-12:00 PM 519 B

FRIDAY NOON, NOVEMBER 15, 2019

Animal Learning & Cognition (2001-2006) Attention Capture (2007-2029) Visual Attention (2030-2045) Bilingual Comprehension (2046-2060) Concepts and Categories I (2061-2071) Emotion and Cognition II (2072-2092) Reward and Motivation in Decision Making (2093-2114) (Author present between 12:00 PM-1:30 PM)

Language Production and Writing II (2115-2131) Speech Perception I (2132-2146) Associative Learning (2147-2166) Reward and Motivation in Learning (2167-2180) Perception and Action (2181-2195) Motor Control and Skill (2196-2204) Neural Mechanisms of Cognition (2205-2225)

FRIDAY AFTERNOON, NOVEMBER 15, 2019

Symposium II: Re-organizing Our Understanding of Semantic and Episodic Memory (66-7	70) 1:30 PM-3:30 PM 517 D
Vision (71-76)	1:30 PM-3:30 PM 520 A
Decision Making I (77-82)	1:30 PM-3:30 PM 519 B
Recall I (83-87)	1:30 PM-3:10 PM 520 B
Skill Acquisition (88-92)	1:30 PM-3:10 PM 520 C
Language and Meaning (93-97)	1:30 PM-3:10 PM 520 F
Event Cognition (98-103)	3:30 PM-5:30 PM 520 C
Spatial Cognition I (104-109)	
Reasoning (110-115)	
Cognitive Control II (116-120)	
Recall II (121-125)	
Bilingual Comprehension (126-130)	



FRIDAY EVENING, NOVEMBER 15, 2019

Consciousness (3001-3015) Attentional Control II (3016-3038) Attention to Features and Object (3039-3053) Cognitive Aging (3054-3071) Decision Making II (3072-3092) Multisensory Perception (3093-3105) Psycholinguistics I (3106-3121)

(Author present between 6:00 PM-7:30 PM)

> Letter/Word Processing II (3122-3137) Reading (3138-3146) Music Cognition (3147-3153) Eyewitness Identification (3154-3170) False Memory (3171-3191) Prospective Memory (3192-3202) Human Learning and Instruction II (3203-3225)

SATURDAY MORNING, NOVEMBER 16, 2019

Human Learning and Instruction I (131-136)	8:00 AM-10:00 AM 519 B
Divided Attention (137-142)	
Judgment and Decision Making I (143-148)	
Letter/Word Processing I (149-153)	8:00 AM-9:40 AM 520 B
Individual Differences in Attention and Cognition (154-158)	
Concepts and Categories (159-163)	
Symposium III: Seeking Explicit Cognitive Processes in Animals (164-169)	10:00 AM-12:00 PM 517 D
Metacognition (170-175)	10:00 AM-12:00 PM 520 B
Cognitive Control III (176-181)	10:00 AM-12:00 PM 520 F
Discourse Processes I (182-186)	
Emotion and Cognition (187-191)	10:20 AM-12:00 PM 519 B
Reasoning and Problem Solving (192-196)	

SATURDAY NOON, NOVEMBER 16, 2019

Poster Session IV		11:00 AM-1:30 PM 517 B
	(Author	present between 12:00 PM-1:30 PM)

Divided Attention (4001-4013)	Psycholinguistics II (4108-4123)
Bilingualism (4014-4030)	Autobiographical Memory (4124-4140)
Cognitive Control II (4031-4044)	Cognitive Skill Acquisition (4141-4145)
Embodied Cognition (4045-4061)	Test Effects on Learning and Memory (4146-3202)
Judgment (4062-4075)	Human Learning and Instruction II (3203-3225)
Numerical Cognition (4076-4086)	Working Memory II (4182-4191)
Cognition and Technology (4087-4095)	Sensation and Perception (4192-4201)
Discourse Processes (4096-4107)	Statistics and Methodology (4202-4216)

SATURDAY AFTERNOON, NOVEMBER 16, 2019

Symposium IV: Beyond a Single Participant: Interactive Social Cognition in Dyads and Groups (197-202)	1:30 PM-3:	30 PM 517 D
Recognition Memory (203-208)	. 1:30 PM-3:	30 PM 520 A
Attention and Scene Processing (209-214)	1:30 PM-3:	:30 PM 519 B
Judgment and Decision Making II (215-219)	. 1:30 PM-3:	10 PM 520 C
Human Learning and Instruction II (220-224)	1:30 PM-3	:10 PM 520 B
Multisensory Perception (225-229)	1:30 PM-3	:10 PM 520 F
Visual Search (230-235)	3:30 PM-5	:30 PM 520 B
Discourse Processes II (236-241)	. 3:30 PM-5:	30 PM 520 C
Judgment (242-247)	3:30 PM-5	:30 PM 520 F
Recognition Memory II (248-252)	. 3:50 PM-5:	30 PM 518 A
Working Memory: Neural Mechanisms and Individual Differences (253-257)	. 3:50 PM-5:	30 PM 520 A
Reading (258-262)	3:50 PM-5:	:30 PM 519 B

SATURDAY EVENING, NOVEMBER 16, 2019

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(Author present between 6:00 PM-7:30 PM)

peech Perception II (5111-5121)
nplicit Memory (5122-5126)
fetamemory and Metacognition (5127-5156)
ecall II (5157-5176)
ecognition Memory II (5177-5191)
Vorking Memory III (5192-5210)

SUNDAY MORNING, NOVEMBER 17, 2019

Attention to Features and Objects (264-269)	
Speech Perception (270-275)	
Working Memory I (276-281)	8:00 AM-10:00 AM 519 B
Motor Control (282-286)	
Statistics and Methodology (287-291)	
Spatial Cognition II (292-296)	8:00 AM-9:40 AM 518 B
Letter/Word Processing II (297-302)	
Decision Making II (303-308)	10:00 AM-12:00 PM 520 F
Metamemory and Cognition (309-311)	
Working Memory II (312-316)	10:20 AM-12:00 PM 519 B
Bilingualism (317-321)	10:20 AM-12:00 PM 518 A

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Condensed Schedule B

FOYER Level 5	517B	517D	518A	518B	519A	519B	
		Thursday, N	November 14, 201	19			
Registration Open 7:30 a.m8:30 p.m.	Poster Session I Viewing 4:00 p.m7:30 p.m. Hospitality 5:30 p.m7:30 p.m. Author Present 6:00 p.m7:30 p.m. Exhibits Open 3:30 p.m10:00 p.m. Opening Reception Immediately following Keynote	Keynote Address 7:30 p.m8:30 p.m.					
		Friday, No	ovember 15, 2019)			
Registration Open 7:30 a.m6:00 p.m. Coffee Break 9:30 a.m10:30 a.m.	Exhibits Open 10:00 a.m2:00 p.m. Poster Session II Viewing 11:00 a.m1:30 p.m. Author Present 12:00 p.m1:30 p.m. Exhibits Open 4:00 p.m8:00 p.m. Poster Session III Viewing 4:00 p.m7:30 p.m. Hospitality 5:30 p.m7:30 p.m. Author Present 6:00 p.m7:30 p.m.	Symposium I: What Memory Quirks, Hiccups, and Odd Phenomena Tell Us 10:00 a.m12:00 p.m. Symposium II: Re-organizing our Understanding of Semantic and Episodic Memory 1:30 p.m3:30 p.m.	Eye Witness 8:00 a.m. 8:00 a.m. Cognitive 3:50 p.m.	Identification -9:40 a.m. Control II -5:30 p.m.	Lunchtime Workshop: Encouraging Future Scientists: Supporting Undergraduates at Psychonomics 12:00 p.m1:30 p.m.	Reward, Motivation, and Decision Making 8:00 a.m10:00 a.m. Bilingual Production 10:20 a.m12:00 p.m. Decision Making I 1:30 p.m3:30 p.m. Bilingual Comprehension 3:50 p.m5:30 p.m.	
		Saturday, N	November 16, 201	9			
Registration Open 7:30 a.m5:00 p.m. Coffee Break 9:30 a.m10:30 a.m. Anniversary Celebration 6:30 p.m7:30 p.m.	Exhibits Open 10:00 a.m2:00 p.m. Poster Session IV Viewing 11:00 a.m1:30 p.m. Author Present 12:00 p.m1:30 p.m. Exhibits Open 4:00 p.m8:00 p.m. Poster Session V Viewing 4:00 p.m7:30 p.m. Hospitality 5:30 p.m7:30 p.m. Author Present 6:00 p.m7:30 p.m.	Symposium III: Seeking Explicit Cognitive Processes in Animals 10:00 a.m12:00 p.m. Symposium IV: Beyond a Single Participant: Interactive Social Cognition in Dyads and Groups 1:30 p.m3:30 p.m.	Individual Differen Cogr 8:00 a.m. Recognitior 3:50 p.m.	ces in Attention and hition -9:40 a.m. h Memory II -5:30 p.m.	Lunchtime Workshop: Workshop on Non- academic Careers for Psychologists 12:00 p.m1:30 p.m.	Human Learning and Instruction I 8:00 a.m10:00 a.m. Emotion and Cognition 10:20 a.m12:00 p.m. Attention and Scene Processing 1:30 p.m3:30 p.m. Reading 3:50 p.m5:30 p.m.	
Sunday, November 17, 2019							
Registration Open 7:30 a.m12:00 p.m. Coffee Break 9:30 a.m10:30 a.m.			Speech Perception 8:00 a.m10:00 a.m. Bilingualism 10:20 a.m12:00 p.m.	Spatial Cognition II 8:00 a.m9:40 a.m.	Attention to Features and Objects 8:00 a.m10:00 a.m. Metamemory and Cognition 10:20 a.m12:00 p.m.	Working Memory I 8:00 a.m10:00 a.m. Working Memory II 10:20 a.m12:00 p.m.	
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Condensed Schedule B

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	520A	520B	520C	520F	521A-C	524A/B	524C
			Thurs	day, November 14,	2019		
			Frid	ay, November 15, 2	2019		
	Cognitive Aging 8:00 a.m9:40 a.m.	Attention Capture 8:00 a.m10:00 a.m.	Perception and Action 8:00 a.m9:40 a.m.	Psycholinguistics 8:00 a.m10:00 a.m.			
	Cognitive Control I 10:00 a.m12:00 p.m.	Letter/Word Processing: Individual and Cultural Differences 10:20 a.m12:00 p.m.	Visual Working Memory 10:00 a.m12:00 p.m.	Associative Learning 10:20 a.m12:00 p.m.		Lunchtime Workshop: Hacking Your Mind: A new PBS Four-	Diversity and Inclusion Reception
	Vision 1:30 p.m3:30 p.m.	Recall I 1:30 p.m3:10 p.m.	Skill Acquisition 1:30 p.m3:10 p.m.	Language and Meaning 1:30 p.m3:10 p.m.		Hour Series 12:00 p.m1:30 p.m.	4:30 p.m5:30 p.m.
	Recall II 3:50 p.m5:30 p.m.	Spatial Cognition I 3:30 p.m5:30 p.m.	Event Cognition 3:30 p.m5:30 p.m.	Reasoning 3:30 p.m5:30 p.m.			
			Satur	day, November 16,	2019		
	Divided Attention 8:00 a.m10:00 a.m. Reasoning and Broblem Solving	Letter/Word Processing I 8:00 a.m9:40 a.m.	Judgment and Decision Making I 8:00 a.m10:00 a.m.	Concepts and Categories 8:00 a.m9:40 a.m.			
	Recognition Memory 1:30 p.m3:30 p.m.	Metacognition 10:00 a.m12:00 p.m.	Discourse Processes I 10:20 a.m12:00 p.m.	Cognitive Control III 10:00 a.m12:00 p.m.	Lunchtime Workshop: Information Session: Funding at the	Business, Awards, and Happy 60th	
		Human Learning and Instruction II 1:30 p.m3:10 p.m.	Judgment and Decision Making II 1:30 p.m3:10 p.m.	Multisensory Perception 1:30 p.m3:10 p.m.	National Science Foundation 12:00 p.m1:30 p.m.	Celebration 5:10 p.m6:30 p.m.	
	Working Memory: Neural Mechanisms and Individual Differences 3:50 p.m5:30 p.m.	Visual Search 3:30 p.m5:30 p.m.	Discourse Processes II 3:30 p.m5:30 p.m.	Judgment 3:30 p.m5:30 p.m.			
			Sund	lay, November 17, 2	2019		
			Motor Control 8:00 a.m9:40 a.m.	Statistics and Methodology 8:00 a.m9:40 a.m.			
			Letter/Word Processing II 10:00 a.m12:00 p.m.	Decision Making II 10:00 a.m12:00 p.m.			

THURSDAY EVENING, NOVEMBER 14, 2019 4:00 PM-7:30 PM Poster Session I (1001-1179)

517 B

Automatic Processing (1001-1012)

- (1001) Kim, Lobo, Hoffman
- (1002) Kan, Mikkelsen, Drummey, Andrew, Abdul-Masih
- (1003) Ham, Koch
- (1004) Maquestiaux, Lyphout-Spitz, Ruthruff
- (1005) Robison, Schulz, Lien, Ruthruff
- (1006) Kasos, Kasos, Kasos, Kekecs, Csirmaz, Veres-Székely, Varga, Kasos, Kekecs, Csirmaz, Veres-Székely, Varga
- (1007) Vaillancourt, Roy-Charland, Dickinson
- (1008) Feng, Coane, Chang, Dacey
- (1009) Blumenthal, Sivakumar
- (1010) Han, Proctor
- (1011) Koch
- (1012) Redden, Kavyani, Christie, Klein

Attentional Control I (1013-1026)

- (1013) Colvett, Nobles, Rodriguez, Bugg
- (1014) Patel, Steyvers, Benjamin
- (1015) Mozel, Folk
- (1016) Servant, Logan
- (1017) Madore, Khazenzon, Backes, Qi, Wagner
- (1018) Pfeuffer, Rosca, Lorenz
- (1019) Hutcheon, Zion, Arnold
- (1020) Meier, Goller, Hillsgrove, Jones, Sumner, Rutherford, Torres Wong
- (1021) Mills, Kinoshita
- (1022) Yang, Hsieh, Hsieh, Fific, Yu, Wang
- (1023) Hood, Hutchison
- (1024) Simonson, Kumakiri, Takamori, Hutson, Ueda, Saiki, Loschky
- (1025) Smeekens, Meier, Silvia, Kwapil, Kane
- (1026) Benson, Zhang, Yan, Zhou, Zebo

Attention and Individual Differences (1027-1036)

- (1027) Shuter, Kan, Caulfield
- (1028) Tullo, Faubert, Bertone
- (1029) Gross, Araujo, Schooler
- (1030) Kay, Unsworth
- (1031) Mashburn, Martin, Engle
- (1032) Leppanen, Kim
- (1033) Tsukahara, Engle
- (1034) Mallik, Mackay, Outen, Fogle, Wilson, Lewis, Metzger
- (1035) Hao, Conway
- (1036) Draheim, Tsukahara, Martin, Mashburn, Engle

Cognitive Control I (1037-1051)

- (1037) Lee, Cho
- (1038) Reimer, Sierra, Perez-Martinez, Mobly, Rivera
- (1039) Welhaf, Smeekens, Meier, Silvia, Kwapil, Kane
- (1040) Mekern, Sjoerds, Hommel
- (1041) van Dooren, Sellaro, Hommel
- (1042) Heijnen, Sellaro, Ciardo, Ke, Koch, Wykowska, Meiran, Hommel
- (1043) Festini

- (1044) Karbach, Johann
- (1045) Baranski
- (1046) Dixon, Fang
- (1047) Ray, Basak
- (1048) Caron, Carriere, Smilek
- (1049) Rheem, Ko, Becker
- (1050) Hershman, Henik
- (1051) Aczel, Kovacs, Bognar, Palfi

Working Memory I (1052-1067)

- (1052) Kuo, Wang, Yeh
- (1053) Overkott, Souza
- (1054) Hakim, Feldmann-Wustefeld, Chai, Vogel
- (1055) Langerock, Vergauwe
- (1056) Peterson, Hanson
- (1057) Tamber-Rosenau, Carlos
- (1058) Decker, Naveh-Benjamin
- (1059) Robinson, Irwin, Benjamin
- (1060) Lee, Kazanas
- (1061) Olsen, Van Til, Erfourth, Fific
- (1062) Foraker, Bellman
- (1063) Sakuma, Takaki
- (1064) Chai Ezra, Magen
- (1065) Debraise, Gauvrit, Mathy
- (1066) Bond, Swartout, Wasburn
- (1067) McCarter, Vickery

Decision Making I (1068-1087)

- (1068) Rosenbaum, Higby, Feghhi, Guo, Mendoza, Ramos
- (1069) Joubran, Watter, Al-Aidroos
- (1070) DeVore, McBride, VonderHaar
- (1071) Hernandez, McBride
- (1072) McCoy, Ruppel, Meek
- (1073) Vanunu, Hotaling, Newell
- (1074) Leong, Schachner
- (1075) Cavve, Hurlstone, Farrell
- (1076) Topolski, Rex Pius Vincent, Morel, Jacobs, Patel
- (1077) Heilman, Trif
- (1078) McDowell, Platania
- (1079) de Gardelle, Cavalan, Vergnaud
- (1080) Karlsson, Lewandowsky, Antfolk, Karlsson, Karlsson, Lindfelt, Soveri
- (1081) Cataldo, Cohen
- (1082) Kim, Malter, Metcalfe
- (1083) Oberholzer, Olschewski, Scheibehenne
- (1084) Robbins
- (1085) Patalano, Neil, Williams
- (1086) Nguyen, Dougherty
- (1087) Yamaghshi, Nishimura

Language Production and Writing I (1088-1098)

(1088) Elliott, Horton

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- (1089) Kilbourn-Ceron, Goldrick
- (1090) Qu, Feng, Damian


- (1091) Sá-Leite, Tomaz, Hernández-Cabrera, Fraga, Comesaña
- (1092) Williams, Schleicher, Ivanova
- (1093) Lebkuecher, Schwob, Kabasa, MacDonald, Weiss
- (1094) Bannon, Humphreys
- (1095) Kelley, Dell
- (1096) Horne, Martin
- (1097) Zur, Eviatar, Karni
- (1098) Niven, Bak

Letter/Word Processing I (1099-1115)

- (1099) Tibi
- (1100) Baciero, Uribe, Gomez
- (1101) Warrington, Paterson, White
- (1102) Veldre, Andrews, Yu, Drieghe, Reichle
- (1103) Schneider, Bade, Janczyk
- (1104) Trifonova, Adelman
- (1105) Folk, Deibel, de Long, Abraham
- (1106) Riano Rincon, Raney
- (1107) Marzouki, Al-Otaibi, Grainger
- (1108) Colombo, Spinelli, Lupker
- (1109) Degno, Wei, Liversedge, Zang
- (1110) Zang, Fu, Du, Lu, Bai, Yan, Liversedge
- (1111) Shlanta, Ashby
- (1112) Nidel, Joanisse
- (1113) Knapp, Shelley-Tremblay, Yates
- (1114) Kapnoula, Samuel
- (1115) Vasilev, Slattery

Human Learning and Instruction I (1116-1129)

- (1116) Lu, Coch, Kang
- (1117) Schuetze, Yan, Eglington
- (1118) Don, Cornwall, Worthy
- (1119) Aldugom, Cook
- (1120) Stull, Fiorella, Similuk, Mayer
- (1121) Van Der Wege, Carothers-Liske, Conour, Deng, Hairston, Hirayama, Kpachavi, LeBlanc, Tolbert, Zheng
- (1122) Tucker, Shaw, Stigler
- (1123) Queen, Alexander, Tiernan
- (1124) Daley, Rawson
- (1125) Pratt, Maass
- (1126) Sana, Yan, Sharma
- (1127) Stephan, Koch
- (1128) Rivers, Dunlosky, McLeod
- (1129) Freeman, Robinson

Recognition Memory I (1130-1143)

- (1130) Crocco, Neely
- (1131) Amado, Yüvrük, Tütüncü, Kapucu
- (1132) Hout, Guevara Pinto, Papesh
- (1133) Davis, Milliken
- (1134) Basnight-Brown, Kazanas, Altarriba
- (1135) Kelly, Risko
- (1136) Kulkarni, Hannula

- (1137) Wulff, Symeonidou
- (1138) Leger, Gutchess
- (1139) Pandey, Taylor
- (1140) Zhang, Hupbach
- (1141) Anderson, Peterson
- (1142) Collin, Chamberland, Brown, Daigle, Boutet
- (1143) Winiger, Kellen, Singmann, Starns

Recall I (1144-1155)

- (1144) McCurdy, Frankenstein, Sklenar, Urban Levy, Leshikar
- (1145) Liao, Mollison, Curran, de Sa
- (1146) Kovacs, Harris
- (1147) Scofield, Johnson
- (1148) Chen, Criss
- (1149) Serra, DeYoung
- (1150) Sommer, Hemmer, Musolino
- (1151) Wang, Hrudka, Briere, Marche
- (1152) Urban Levy, Leshikar
- (1153) Aka, Bhatia
- (1154) Jacobs, Ferreira
- (1155) McNeely-White, Cleary

Spatial Memory (1156-1165)

- (1156) Chicoine, Wilke, Porga, Hall, Moran, Mays, Meyer, Lee
- (1157) Newman, McNamara
- (1158) Marois, Duhaime, Chamberland, Vachon, Tremblay
- (1159) Mou, Lei
- (1160) Du, Ekstrom, Starrett
- (1161) Tansan, Shipley, Newcombe
- (1162) Qi, Lei, Mou
- (1163) Brunye, Hendel, Gardony, Taylor
- (1164) Keller, Brunye, Wolford II, Taylor
- (1165) Dudas-Thomas, Echols-Jones, Messner, Gardony, Taylor

Emotion and Cognition I (1166-1179)

- (1166) Purcell, Twal, Stewart
- (1167) Nishiguchi
- (1168) Clancy, Fenske
- (1169) Ishikawa, Oyama, Okubo
- (1170) Steindorf, Rummel, Neubauer, Boywitt
- (1171) Thapar
- (1172) Valdes, Klages
- (1173) Foglia, Roy-Charland, Sonier, Perron
- (1174) Day, Fenn
- (1175) Leblanc-Sirois, Blanchette
- (1176) Fartoukh
- (1177) Hildebrandt, Sutton
- (1178) Bąk, Altarriba
- (1179) Bilge, Telli

FRIDAY MORNING, NOVEMBER 15, 2019

8:00 AM-11:55 AM

Spoken Sessions (1-65)

Cognitive Aging (1-5) 520 A

Conway, Akhtar
Bruine de Bruin, McNair, Strough
Boutet, Shah, Collin, Berti, Persike,
Meinhardt-Injac
Banai, Lavie, Rotman
Brunsdon, Bradford, Ferguson 🔒

Attention Capture (6-11) 520 B

-	
8:00-8:15 AM	Hyman, Hyman
8:20-8:35 AM	Yamaguchi
8:40-8:55 AM	Tsal, Max
9:00-9:15 AM	Leber, Allon
9:20-9:35 AM	Theeuwes
9:40-9:55 AM	Raymond, Dodgson, MacLean

Psycholinguistics (12-17) 520 F

8:00-8:15 AM	Brown-Schmidt, Ahn
8:20-8:35 AM	Saryazdi, Chambers
8:40-8:55 AM	Meyer, Brehm
9:00-9:15 AM	Westbury
9:20-9:35 AM	Eviatar, Kreiner
9:40-9:55 AM	Titone, Palma, Marin, Onishi

Reward, Motivation, and Decision Making (18-23) 519 B

8:00-8:15 AM	Maloney, Zhang
8:20-8:35 AM	Stevenson, Morgan, Qi Li, Gjika
8:40-8:55 AM	Reyna, Edelson, Erez, Weldon, Tarpinian
9:00-9:15 AM	Lau, Ozono, Kuratomi, Komiya, Murayama
9:20-9:35 AM	Müller, Cañal-Bruland
9:40-9:55 AM	Fenske, Clancy, Driscoll, Codeluppi, Drolet
	Kukkonen

Eyewitness Identification (24-28) 518 A

- 8:00-8:15 AM Dodson, Gettleman, Grabman
- 8:20-8:35 AM Peterson, Davis, Wissman, Slater
- 8:40-8:55 AM Dunn, Semmler, McCormick, Kellen
- 9:00-9:15 AM Cohen, Starns, Rotello, Cataldo
- 9:20-9:35 AM Colloff, Wilson, Seale-Carlisle, Flowe, Wixted

Perception and Action (29-33) 520 C

8:00-8:15 AM Pfister, Kunde, Schwarz, Weller
8:20-8:35 AM Palmer, Tranchant, Scholler
8:40-8:55 AM Pfordresher, Greenspon, Friedman, Palmer
9:00-9:15 AM Proctor, Chong
9:20-9:35 AM Cañal-Bruland, Müller

Symposium I: What Memory Quirks, Hiccups and Odd Phe-

nomena Tell Us (34-39) 517 D 10:00-10:15 AM Peynircioglu, Wong 10:20-10:35 AM Undorf 10:40-10:55 AM Smith 11:00-11:15 AM O'Connor, Aitken 11:20-11:35 AM Cleary, Huebert, McNeely-White 11:40-11:55 AM Mulligan

Visual Working Memory (49-54) 520 C

10:00-10:15 AM Becker, Martin, Hamblin-Frohman 10:20-10:35 AM Souza, Overkott, Matyja, Jang 10:40-10:55 AM Ricker 11:00-11:15 AM Brady **Q**, Miner, Wixted, Schurgin 11:20-11:35 AM Oberauer **Q**, Lin 11:40-11:55 AM Pratte

Cognitive Control I (60-65) 520 A

10:00-10:15 AM Koch, Philipp, Schuch 10:20-10:35 AM Awh, Foster 10:40-10:55 AM Weissman 11:00-11:15 AM Whitney, Hinson, Van Dongen, Honn, Nusbaum 11:20-11:35 AM Washburn, Salamanca, Bond, Johnson, Love, Whitham 11:40-11:55 AM Rouder, Kumar, Haaf

Letter/Word Processing: Individual and Cultural Differences (40-44) 520 B

- 10:20-10:35 AM Cohen-Goldberg, Sevcikova Sehyr, Emmorey, Caselli
- 10:40-10:55 AM Sevcikova Sehyr, Manriquez, Emmorey
- 11:00-11:15 AM Schotter, Johnson, Lieberman
- 11:20-11:35 AM Caldwell-Harris, Zhu, Jia, Huibonhoa 11:40-11:55 AM Li

Associative Learning (45-48) 520 F

- 10:20-10:35 AM Coutanche, Paulus
- 10:40-10:55 AM Vickery, Rogers, Park
- 11:00-11:15 AM Miller, Li, Tsvetkov, Alcaide, Witnauer, Castiello De Obeso, Morrissey, Polack,

Murphy

11:20-11:35 AM Lee, Lovibond

Bilingual Production (55-59) 519 B

10:20-10:35 AM	Francis, Tovar

- 10:40-10:55 AM Bradlow
- 11:00-11:15 AM Gilbert, Gullifer, Wolpert, Saito, Kousaie, Itzhak, Gracco, Klein, Phillips, Titone, Baum 11:20-11:35 AM Ivanova
- 11:40-11:55 AM Kennison, Spooner

FRIDAY NOON, NOVEMBER 15, 2019 11:00 AM-1:30 PM

Poster Session II (2001-2225)

517 B

Animal Learning & Cognition (2001-2006)

- (2001)Crystal, Panoz-Brown
- Bowden, Jackson, Church, Smith (2002)
- Nafcha, Shamay-Tsoory, Gabay (2003)
- Mallikarjun, Shroads, Newman (2004)
- Taniuchi (2005)
- Jackson, Adamcyzk, Church, Smith (2006)

Attention Capture (2007-2029)

- Oyama, Ishikawa, Okubo (2007)
- (2008)Lamy
- (2009)Kamal, Morrison, Campbell, Taler
- (2010)Vachon, Fitzback-Fortin, Provost, Labonté, Marsh
- (2011)Pitt, Freggens
- (2012)Gong, Sun
- Williams, Ferber, Pratt (2013)
- Purohit, Kennedy, Lien, Ruthruff (2014)
- (2015) Prasad, Mishra
- Thayer, Bahle, Hollingworth (2016)
- (2017) Plantier, Vecera
- Lim, Pratt (2018)
- Pereira, Birmingham, Ristic (2019)
- Kershner, Moore (2020)
- Adams, Gaspelin (2021)
- (2022)Key, Sali
- (2023)Choi, Cho
- Huffman, Brockmole (2024)
- (2025)Dague, Sobel, Dacus, Puri
- (2026)Donaldson-Misener, Allard
- (2027)Iricinschi, Darazsdi
- Grégoire, Britton, Anderson 🔒 (2028)
- Minor, Nickel, Hannula (2029)

Visual Attention (2030-2045)

- (2030)Cronin, Henderson
- (2031)Zinchenko, Conci, Töllner, Müller, Gever
- Charbonneau, Marois, Moffitt, Szolosi, Watson (2032)
- Daly, Pitt (2033)
- Merzon, Zhulikov, Malevich, Krasovskaya, MacInnes (2034)
- Krasovskaya, Kristjansson, MacInnes (2035)
- (2036)Adler, Intraub
- (2037)Kiat, Luck
- (2038)Cochrane, Townsend, Legere, Lee, Milliken, Shedden
- (2039)Chang, Stone, Cave
- O'Donnell, Wyble (2040)
- Sager, Di Lollo, Spalek (2041)
- (2042)Bernardic, Scheibehenne
- (2043)Drisdelle, Corriveau, Fortier-Gauthier, Jolicoeur
- (2044)Feltmate, Dickie, Walton, Klein
- Leonard, Lister, Salagovic (2045)

Bilingual Comprehension (2046-2060)

- Hoversten, Traxler (2046)
- (2047)Degani, Elias

- (2048)Incera, Mcguffin
- Dussias, Beatty-Martínez, Guzzardo Tamargo (2049)
- (2050)Kootstra, Unsworth
- Ning, Bartolotti, Marian (2051)
- Kacinik, Chen, Zhang, Wu (2052)
- Mohamed, Jared (2053)
- Tiv, Vingron, Rouillard, Deodato, Wiebe, Titone (2054)
- Poarch, Langer (2055)
- (2056)Friesen, Ward, Bohnet, Cormier, Jared
- (2057)Grant, Kousaie, Coulter, Gilbert, Baum, Gracco, Klein, Titone, Phillips
- (2058)Mizrahi, Creel
- (2059)Cotter, Rossi
- WannerKawahara, Yoshihara, Lupker, Nakayama (2060)

Concepts and Categories I (2061-2071)

- Richie, White, Bhatia, Hout (2061)
- Chen, Himelein-Wachowiak, Billups, Durgin (2062)
- (2063)Nicoladis
- (2064)Schertz, Kardan, Berman
- Brashears, Minda (2065)
- Borbely, Baross, Szabo (2066)
- Hatherley, Soud, Minda (2067)
- Cornwall, Byrne, Davis, Worthy (2068)
- (2069)Nam, Lee, Hong, Kim
- (2070)Wetzel, Kurtz
- (2071)Xia, Solomon, Thompson-Schill, Jenkins

Emotion and Cognition II (2072-2092)

- Karlinsky, Howe, deJonge, Kingstone, Sabiston, Welsh (2072)
- (2073)Mitsuda, Jiawei, Qiyan
- (2074)Reed, Berlin, Diamond, Potter, Jo, Kim, Saikley,
- Couperus, Bukach
- (2075)Bonsel, Koshino
- Chesney, Palomba (2076)
- (2077)Allen, Miller
- (2078)Li, Szpunar
- (2079)Lee
- (2080)Lee, Jang
- Wilck, Pascazi, Altarriba (2081)
- (2082)Li, Hills
- (2083)Hensley, Otani, Hamaker, Roupe
- (2084)Westerman, Dodson, Lurie, Wilson
- (2085)Chen, Guo, Chan, Marian
- (2086)Chong, Proctor
- (2087)Gallant, Michaud, Roy-Charland

Sato, Muranaka, Hata, Motoyoshi

Reward and Motivation in Decision Making (2093-2114)

(2088)Reppa

Liu

(2090)

(2091)

(2092)

(2093)

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(2089)Armstrong, Cutting Peissig, Gann

Smith, Ricks

- (2094) Fastrich, FitzGibbon, Lau, Murayama
 (2095) Mason, Ludvig
 (2096) Terao, Sorama
 (2097) Ballard, Neal, Farrell, Heathcote
 (2098) Qin, Joslyn, Savelli, Demuth, Morss, Ash
- (2099) Casteel
- (2100) Zilker, Pachur
- (2101) Han, Ludwig, Quadflieg
- (2102) Kuntzelman, Zosky, Dodd
- (2103) Jarecki, Rieskamp(2104) Milligan, Schotter
- (2104) Winigan, Schotter (2105) Chantland, Wang, Delgado, Ravizza
- (2106) Byrne
- (2107) Sparrow, Swirsky, Spaniol
- (2108) Yang, Worthy
- (2109) Weldon, Drake, Fama
- (2110) Stone, FitzGibbon, Millan, Murayama
- (2111) Elliott, D'Ardenne, Schweitzer, McClure
- (2112) Jenifer, Choe, Rozek, Berman, Beilock
- (2113) West, Dapore, Ash, Malley
- (2114) Hemed, Bakbani-Elkayam, Teodorescu, Yona, Eitam

Language Production and Writing II (2115-2131)

- (2115) Alderete
- (2116) Zeelenberg, Pecher, Ferrand
- (2117) Ostrand, Guarini
- (2118) Guydish, D'Arcey, Liu, Fox Tree
- (2119) Wang, Wong, Chen
- (2120) Zhang, Diaz
- (2121) Chanquoy, Guetat, Mauro
- (2122) Yoshihara, Nakayama, Hino
- (2123) Dubarry, Runnqvist, Baus, Alario
- (2124) Krause, Kawamoto
- (2125) Lau, Ferreira, Momma
- (2126) O'Seaghdha, Everidge, Hupbach, Heflin
- (2127) Liu, WannerKawahara, Yoshihara, Lupker, Nakayama
- (2128) Neergaard, Luo, Huang
- (2129) Zamuner, Lopez, Roussel
- (2130) Irons, Fischer-Baum
- (2131) Bannon, Watter, Cerisano, Humphreys

Speech Perception I (2132-2146)

- (2132) Chan, Lee
- (2133) McGarrigle, Rakusen, Mattys
- (2134) Strori, Souza, Bradlow
- (2135) Van Hell, Danielson, Fernandez
- (2136) Brown, Strand, Van Engen
- (2137) Saltzman, Myers
- (2138) Charoy, Takahashi, Huffman, Hendrickson, Brennan
- (2139) Tuft, Fernandes, Incera, McLennan
- (2140) Yu, Fecher, Johnson
- (2141) Exton, Newman
- (2142) Heffner, Myers
- (2143) Tzeng, Vazquez Olivieri, Nygaard
- (2144) St. Pierre, Nur, Johnson
- (2145) Olmstead, Viswanathan, Lee
- (2146) Martinez, Ruggiero, Javardian, Feeley, Morlet, Toscano

Associative Learning (2147-2166)

- (2147) Dester, Lazarus, Healey
- (2148) Lazarus, Dester, Uitvlugt, Healey
- (2149) Ngo, Newcombe, Olson
- (2150) Scotti, Janakiefski, Smerdell, Maxcey
- (2151) Featherston, Hale, Myerson
- (2152) Patel, Lorentz, Davis, Stanley, Shore
- (2153) Mennie, Lane
- (2154) Smith, McElhannon
- (2155) Li, Scaringi, Yang
- (2156) Maxwell, Huff
- (2157) Roberts, Mclean, Forrin, Risko, MacLeod
- (2158) Bruett, Calloway, Tokowicz, Coutanche
- (2159) Greenaway, Livesey
- (2160) Antony, Graves, Osborne, Turk-Browne, Bennion
- (2161) Beukers, Norman
- (2162) Garlitch, Wahlheim
- (2163) Sorenson, Kelley
- (2164) Miller, Unsworth
- (2165) Tosatto, Fagot, Rey
- (2166) Otsuka

Reward and Motivation in Learning (2167-2180)

- (2167) Mannering, Jones
- (2168) Goodman, Seymour
- (2169) Braun, Ithisuphalap, Zaragoza
- (2170) Horn
- (2171) Fujita, Kato
- (2172) Yeung, Fernandes
- (2173) Gallant, Min, Bachman, Mather
- (2174) Liao, Grégoire, Anderson **Q**
- (2175) Hargis, Castel, Bjork
- (2176) Patterson, Castel, Knowlton
- (2177) Sklenar, McCurdy, Frankenstein, Urban Levy, Leshikar
- (2178) Rouhani, Norman, Niv, Bornstein
- (2179) Kapucu, Özkılıç, Amado
- (2180) Hudson, Murphy, Szpunar

Perception and Action (2181-2195)

- (2181) Nishimura
- (2182) Xiong, Proctor, Xu, Zelaznik
- (2183) Paxton, Chiovaro
- (2184) Hilchey, Pratt
- (2185) Terry, Thornton, Trick
- (2186) Wright, Levin
- (2187) Richardson, Fournier
- (2188) Gardony, Horner, Brunye

Chihak, Yoshida, Bordwell

Motor Control and Skill (2196-2204)

Bai, Zhang, Zhao, Chen

Grießbach, Cañal-Bruland, Herbort

Park, Park

Schröger, Tolentino-Castro, Raab, Cañal-Bruland

- (2189) Böffel, Müsseler
- (2190) Saneyoshi, Michimata
- (2191) Bell, Macuga
- (2192) Tien, Chang(2193) Cheung, Guo, Frost, Pereira, Niemeier

(2194)

(2195)

(2196)

(2197)

(2198)

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- (2199) Savalia, Cowell, Huber
- (2200) Yabe, Nasu, Kashino
- (2201) Slobodenyuk
- (2202) Parillo, Logan
- (2203) Khan, Panatik
- (2204) Sperl, Cañal-Bruland

Neural Mechanisms of Cognition (2205-2225)

- (2205) Kalfaoglu, Stafford, Milne
- (2206) Palkowitz, Chammany, Crump, Behmer, Jr.
- (2207) Chammany, Palkowitz, Crump, Behmer, Jr.
- (2208) Grundy, Barker, Porkert, Bialystok
- (2209) Williams, Wilson, Alonso, Luria, Drew
- (2210) Chidharom, Krieg, Bonnefond
- (2211) Hawks, Hutchison

- (2212) LoTemplio, Scott, Hopman, McDonnell, McKinney, Payne, Castro, McNay, Greenberg, Strayer
- (2213) Hughes, Houston, Vorster, Luciano, Loth, Allen
- (2214) Cole, Kuntzelman, Dodd, Johnson
- (2215) Bagherzadeh Azbari, Hildebrandt, Sommer
- (2216) Frings, Moeller, Pastötter
- (2217) Zinchenko, Nikonova, Klucharev
- (2218) Smith, Karuza, Thompson-Schill
- (2219) Stepan, Altmann, Fenn
- (2220) Karanian, Rabb, Jimbo, Torrance, Carlisle, Wulff, Thomas, Race
- (2221) Bailey, Lyday, Laurienti, Dagenbach
- (2222) Mei, Wu
- (2223) Moreau, Joanisse, Batterink
- (2224) Diaz, Vogel, Awh
- (2225) Alexeeva, Myachykov, Bermudez-Margaretto, Shtyrov, Morss, Ash

FRIDAY AFTERNOON, NOVEMBER 15, 2019

1:30 PM-5:25 PM

Spoken Sessions (66-130)

Symposium II: Re-organizing Our Understanding of Semantic and Episodic Memory (66-70) 517 D

tic and Episouic	Wiemory (00-70)
1:30-1:45 PM	Renoult
1:50-2:05 PM	Sheldon
2:10-2:25 PM	Ranganath
2:30-2:45 PM	Grilli
2:50-3:05 PM	Andrews-Hanna

Vision (71-76) 520 A

1:30-1:45 PM	Durgin, Portley
1:50-2:05 PM	Loschky, Smith
2:10-2:25 PM	Francis, Cummins, Kim, Grzeczkowski,
	Thunell
2:30-2:45 PM	Peterson 😭, Perez
2:50-3:05 PM	Arguin, Ferrandez, Massé
3:10-3:25 PM	Pomerantz

Decision Making I (77-82) 519 B

1:30-1:45 PM	Broniatowski, Reyna, Marti
1:50-2:05 PM	Pachur
2:10-2:25 PM	Trueblood, Heathcote, Evans, Holmes
2:30-2:45 PM	Hawkins, Heathcote
2:50-3:05 PM	Konstantinidis, Dai, Newell
3:10-3:25 PM	Rieskamp, Olschewski

Recall I (83-87) 520 B

1:30-1:45 PM	MacLeod
1:50-2:05 PM	Rose, Doolen, O'Rear
2:10-2:25 PM	McDermott 🔒, Zerr
2:30-2:45 PM	Caplan, Thomas
2:50-3:05 PM	Hanczakowski, Wilding, Zawadzka

Skill Acquisition (88-92) 520 C

1:30-1:45 PM	Song, Guo, Zhang, Sternad
1:50-2:05 PM	Brown, Gunawan, Hawkins, Tran, Kohn
2:10-2:25 PM	Steyvers, Hawkins, Karayanidis, Brown
2:30-2:45 PM	Macnamara, Frank
2:50-3:05 PM	Day, Caldwell, Ikner

Language and Meaning (93-97) 520 F

1:30-1:45 PMPexman, Muraki, Sidhu1:50-2:05 PMBuchanan, De Deyne, Montefinese2:10-2:25 PMLiversedge, Zhang, Degno, Zang2:30-2:45 PMYap, Goh, Muraki, Sidhu, Pexman2:50-3:05 PMSiew	0 0	
1:50-2:05 PMBuchanan, De Deyne, Montefinese2:10-2:25 PMLiversedge, Zhang, Degno, Zang2:30-2:45 PMYap, Goh, Muraki, Sidhu, Pexman2:50-3:05 PMSiew	1:30-1:45 PM	Pexman, Muraki, Sidhu
2:10-2:25 PMLiversedge, Zhang, Degno, Zang2:30-2:45 PMYap, Goh, Muraki, Sidhu, Pexman2:50-3:05 PMSiew	1:50-2:05 PM	Buchanan, De Deyne, Montefinese
2:30-2:45 PM Yap, Goh, Muraki, Sidhu, Pexman 2:50-3:05 PM Siew	2:10-2:25 PM	Liversedge, Zhang, Degno, Zang
2:50-3:05 PM Siew	2:30-2:45 PM	Yap, Goh, Muraki, Sidhu, Pexman
	2:50-3:05 PM	Siew

Event Cognition (98-103) 520 C

3:30-3:45 PM	Brown, Shi, St. Jacques
3:50-4:05 PM	Kan, Andrew, Drummey, Gjertsen
4:10-4:25 PM	Kersten, Earles, Smithwick, Frank
4:30-4:45 PM	Zacks, Stawarczyk, Eisenberg, Wahlheim
4:50-5:05 PM	Swallow, Wang
5:10-5:25 PM	Radvansky, O'Rear

Spatial Cognition I (104-109) 520 B

3:30-3:45 PN	A Shelton	ı, Cortesa, Yang, Landau
3:50-4:05 PN	A Saint-A	Aubin, Voyer, Altman, Gallant, Doyle
4:10-4:25 PN	Л Hubba	rd, Ruppel
4:30-4:45 PN	Л Kelly, C	Cherep, Lim, Ostrander, Gilbert
4:50-5:05 PN	A Chrast	il, Montello, Davis
5:10-5:25 PN	A McNai	nara

Reasoning (110-115) 520 F

3:30-3:45 PM	Russo, Meloy
3:50-4:05 PM	Hayes, Wei, Dunn, Stephens
4:10-4:25 PM	Ackerman, Sidi, Torgovitsky
4:30-4:45 PM	Lewandowsky, Woike, Oberauer 🔒
4:50-5:05 PM	Bar-Hillel
5:10-5:25 PM	Pepperberg, Gray, Cornero, Mody, Carey

Cognitive Control II (116-120) 518 A

3:50-4:05 PM	Reeves
4:10-4:25 PM	Kingstone, Kachkovski, Vasilyev, Kuk, Welsh
4:30-4:45 PM	Besner, McLean
4:50-5:05 PM	Kyllingsbæk, Oren, Grünbaum
5:10-5:25 PM	Heathcote, Damaso, Castro, Strayer

Recall II (121-125) 520 A				
3.50 1.05 DM	Waidamann	Kahana		

3:50-4:05 PM	Weidemann, Kahana	3:50-4:03
4:10-4:25 PM	Hupbach, Scully	
4:30-4:45 PM	Anderson 🔒, Shanker, Turnbull, Brumerloh,	4:10-4:25
	Fawcett	4:30-4:45
4:50-5:05 PM	Neath, Quinlan, Surprenant	
5:10-5:25 PM	Logan	4:50-5:05

Bilingual Comprehension (126-130) 519 B

 3:50-4:05 PM Angele, Freitas Pereira Toassi, Slattery, Nogueira Teixeira
 4:10-4:25 PM Lavric, Graham
 4:30-4:45 PM Magliano, Higgs, Santuzzi, Tonks, Feller, Kopatich
 4:50-5:05 PM Schwartz, Tarin
 5:10-5:25 PM Kuperman, Nisbet, Siegelman

FRIDAY EVENING, NOVEMBER 15, 2019

4:00 PM-7:30 PM

Poster Session III (3001-3225)

517 B

Consciousness (3001-3015)

- (3001) Kim, Kim, Hong
- (3002) Smith, O'Neill, Seli
- (3003) Allen, Brady 🕯
- (3004) Rummel, Hagemann, Steindorf, Schubert
- (3005) Zhang, Qu, Miller, Cortina
- (3006) Nieto, Welhaf, Mallick, Banks
- (3007) Harris, Hayward, Andrews
- (3008) Morgan, Ozmen, O'Connor, Flanagan, Pruyser, Abrams
- (3009) Nicosia, Balota, Bugg
- (3010) Tirso, Geraci
- (3011) Gosseries, Sombrun, Wolff, Thibaut, Sanz, Raimondo, Vecchio, Panda, Taulelle, Vanhaudenhuyse, Laureys
- (3012) Tang, McBeath
- (3013) Nikiforova, Huber, Cowell
- (3014) Anderson, Farb
- (3015) Eldridge, Kazanas

Attentional Control II (3016-3038)

- (3016) McCormick, Klein, Ivanoff, Debly, Westcott
- (3018) Ziaka, Skoteinou, Protopapas
- (3019) Dey, Bugg
- (3020) Suh, Bindert, Vuppaladhadiam, Matney, Seidman, Bugg
 (3021) Sohn, Deng
- (3022) Crouse, Seymour
- (3023) Martín-Arévalo
- (3024) Xiong, van Weelden, Franconeri
- (3025) Kahan, Zhang
- (3026) Slowiaczek, Kahan, Harrison
- (3027) Pelland-Goulet, Jolicoeur, Arguin
- (3028) Junker, Zhang, Shin
- (3029) Cohen-Shikora, Suh, Bugg
- (3030) Chao
- (3031) Kim, Choi, Choi, Cho
- (3032) Weidler, Cohen-Shikora, Hicks, McKinnon
- (3033) Spinelli, Lupker
- (3034) Grant, Cookson, Weissman
- (3035) Hopman, Logan, Hillman, Kramer
- (3036) Koger, Pfeuffer
- (3037) Padilla, Castro, Quinan, Ruginski, Creem-Regehr
- (3038) Lawrence, Edwards, Goodhew

Attention to Features and Object (3039-3053)

- (3039) Fu, Miller, Dodd
- (3040) Arnicane, Souza
- (3041) Alzahabi, Cain
- (3042) Goulet, Cousineau
- (3043) Naidoo, Zafar, Tucker, Hindy
- (3044) Williams, Schabacker
- (3045) Lafko, Becker
- (3046) Ceja, Franconeri
- (3047) Epstein, Quilty-Dunn, Mandelbaum, Emmanouil
- (3048) Ivanoff, Keen, Bull Emmanuel, Liu
- (3049) Starks, Paradiso, Shafer-Skelton, Martinez, Golomb
- (3050) Kasai, Makinae, Fuji, Imiya, Kitajo
- (3051) Larson, Johnston, Warren, Patterson
- (3052) Jankovic, Spalek, Di Lollo
- (3053) Desjardins, Lina, De Beaumont, Gagnon, Jolicoeur

Cognitive Aging (3054-3071)

- (3054) Mansour, James, Baynard-Montague
- (3055) Rabipour, Porteus, Campbell, Davidson
- (3056) Bradford, Brunsdon, Ferguson **Q**
- (3057) Harada, Sugawara, Takawaki, Suto
- (3058) Allen, Lamancusa, Houston, Hughes, Lien
- (3059) Oyao, Forloines, Robertson, Grilli, Ekstrom
- (3060) Kyröläinen, Kuperman
- (3061) Elshiekh, Subramaniapillai, Rajagopal, Pasvanis, Ankudowich, Rajah
- (3062) Multhaup, Kopp, Sockol
- (3063) Yang, Sodouri, Foo, Gallant
- (3064) Davis, Chemnitz, Collins, Campbell
- (3065) Ryan, Campbell
- (3066) Greene, Rhodes, Naveh-Benjamin
- (3067) Kuhns, Touron
- (3068) Hosokawa
- (3069) Evrard, Gilet, Colombel
- (3070) Bastin, Besson
- (3071) Subramaniapillai, Rabipour, Rajah

Decision Making II (3072-3092)

- (3072) Mekhtikhanova
- (3073) Caparos, Gosling, Moutier
- (3074) Megías-Robles, Gómez-Leal, Gutiérrez-Cobo, Cabello, Fernández-Berrocal
- (3075) Hayes, Wedell
- (3076) Peters, Lewis

- (3077) Moore, Kortenkamp, Miller, Pitney
- (3078) Liang, Sloane, Donkin, Newell
- (3079) Wi, Ota, Dekker, Maloney
- (3080) Hancock, Nesmith, Tran, Marzolf, McCray
- (3081) Capodanno, Salamanca, Kleider-Offutt, Washburn
- (3082) Alam, Mueller
- (3083) He, Li, Zhang, Li
- (3084) Fang, Schooler
- (3085) Martin Luengo, Alexeeva, Zinchenko, Shtyrov
- (3086) Caballero, Pell
- (3087) Szollosi, Donkin, Newell
- (3088) Chow, Livesey
- (3089) Friel, Gitcho, Robinson Stockton, Pratcher
- (3090) Jeong, Kang, Leem, Park
- (3091) Ota, Maloney
- (3092) Zhao, Coady, Bhatia

Multisensory Perception (3093-3105)

- (3093) Simal, Jolicoeur
- (3094) Desmarais, Schneeberger
- (3095) Villalonga, Sussman, Sekuler
- (3096) Konishi, Yokosawa
- (3097) Jabbari, Sharma, Mohrenschildt, Shedden
- (3098) Tatz, Peynircioglu
- (3099) Leach, Medina
- (3100) Grondin, Azari, Mioni, Rousseau
- (3101) O'Neal, Medina
- (3102) Ono, Hirose, Mori
- (3103) O' Dowd, Sorgini, Hirst, Newell
- (3104) Kenney, O'Malley, Song, von Mohrenschildt, Shedden
- (3105) Yokosawa, Hayashi

Psycholinguistics I (3106-3121)

- (3106) Wong, Veldre, Andrews
- (3107) Reid, Katz
- (3108) Joseph, Malt
- (3109) Tio, Lakshmanan
- (3110) Sidhu, Westbury, Hollis, Pexman
- (3111) Yu, McBeath, Glenberg
- (3112) Ferretti, Eerland, DiMarco, Feller, Magliano
- (3113) Emerson, Özçalışkan, Conway
- (3114) Mirault, Broqua, Dufau, Holcomb, Grainger
- (3115) Patson
- (3116) Norberg, Fraundorf
- (3117) Kawabata, Matsuka
- (3118) Carlson, Gertel, DiMercurio, Diaz, Sandberg
- (3119) Pulido, Dussias
- (3120) Taikh, Gagné, Spalding
- (3121) Misic, Filipović Đurđević

Letter/Word Processing II (3122-3137)

- (3122) Lo, Yap, Andrews
- (3123) Ahn, Jo, Shin, Lee
- (3124) Meade, Grainger, Midgley, Holcomb, Emmorey
- (3125) Chee, Chow, Yap, Goh
- (3126) Barach, Sheridan, Feldman
- (3127) Oralova, Boshra, Schmidtke, Connolly, Kuperman
- (3128) Perea, Gomez, Marcet
- (3129) Simmons, Magnuson
- (3130) Mo, Beekhuizen, Stevenson, Armstrong

- (3131) Yao
- (3132) Eskenazi, Nix
- (3133) Abraham, Folk
- (3134) Arco, Hirshorn
- (3135) Zhang, Liversedge, Zhang, Bai, Zang
- (3136) Crinnion, Cohen-Goldberg, Schubert
- (3137) Content, Seyll

Reading (3138-3146)

- (3138) Pagan, Degno, Kirkden, White, Liversedge, Paterson
- (3139) Coskun, Kryvobok, Kuperman
- (3140) Wang, Blythe, Liversedge
- (3141) Martin-Arnal, León, Olmos
- (3142) Yu, Fu, Liu, Kinoshita
- (3143) Gleni, Ktistakis, Agiorgiotakis, Simos, Tsilimbaris, Plainis
- (3144) Li, Sherlock, Wang
- (3145) Donovan, Chen, Rapp
- (3146) Smith, Mills

Music Cognition (3147-3153)

- (3147) Lempert, Abdul-Nabi, Hartlaub
- (3148) Ziede, Long, Burnham
- (3149) Kleinsmith, Sheridan
- (3150) Frane, Monti
- (3151) Getz, Barton, Perry
- (3152) Fitzroy, Breen
- (3153) Chrobak, Bowe, Karst

Eyewitness Identification (3154-3170)

- (3154) Rumschik, Cutler
- (3155) Kurinec, Weaver
- (3156) Birch, Logory, Wagaman
- (3157) VanArsdall, Ovan
- (3158) Toglia, Alfano, Berman, Todorovic, Rumschik
- (3159) Arndt, Kraner, Xu, Wu, Lotstein, Morris
- (3160) Seale-Carlisle, Lin, Tekin, Roediger, Mickes
- (3161) Barideaux Jr., Conrady
- (3162) Stevens, Kleider-Offutt
- (3163) Wooten, Carlson, Lockamyeir, Jones
- (3164) Lyle, French, Kelley

False Memory (3171-3191)

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(3165) Lockamyeir, Carlson, Jones, Carlson, Weatherford, Goodsell

Meeks, Tallman, Posey, Jeter, Williams, Franco,

Porretta, Kyröläinen, Nassereddine, Buchanan

Umanath, Castillo, Selig, Tritschler, Choi

Maswood, Luhmann, Rajaram 🔒

- (3166) Wilson, Donnelly, Wixted
- (3167) Mah, Baldassari, Lindsay
- (3168) Rothweiler, Meissner, Colloff, Flowe

Paulo, Jones, Mendes

Cadavid, Luna, Botía

Hester, Swanson, Watt

Gilet, Colombel, Evrard

Houts, Levine

Tan, Hockley

Kawasaki, Okubo

(3169) Albright, Gepshtein, Wang, He, Diep

- (3180) Sinclair, Manalili, Barense
- (3181) Bennion, Le, Kumnick, Antony
- (3182) Culbreth, Putnam
- (3183) Olszewska, Ulatowska, Smith, Peterson
- (3184) Cam, McBride, Coane, Chang, Antone, Zeng
- (3185) Manley, Chan, O'Donnell
- (3186) Dianiska, Meissner
- (3187) Thibault, Skinner, Smith, Hunt
- (3188) Schiller, Kazanas
- (3189) Wulff, Karanian, Race, Thomas
- (3190) Castel, Whatley, Schwartz, Block, Siegel
- (3191) DelGrosso-Wernette, Fenn

Prospective Memory (3192-3202)

- (3192) Tanguay, Rutt, Renoult, Atance
- (3193) Martin
- (3194) Vogel, Kuka, Brunsman, Smith
- (3195) Jones, Scullin
- (3196) Isingrini, Fay, Angel, Taconnat, Vanneste, Bouazzaoui
- (3197) Anderson, Strube, McDaniel
- (3198) Morita
- (3199) Guynn, Underwood, Lopez
- (3200) Villarreal, McBride
- (3201) Hacker, Bianchi, Shelton
- (3202) Lacroix, Walker, Aswad, Ghadie, Morgan

Human Learning and Instruction II (3203-3225)

- (3203) LoGiudice, Norman, Kulasegaram, Monteiro, Watter
- (3204) Parong, Mayer
- (3205) Fiorella, Stull, Kuhlmann, Mayer
- (3206) Lurie, Wilson, Dodson
- (3207) Tsuboi, Boushka, Najera, Nevarez, Francis
- (3208) Rohrer, Dedrick, Chueng, Hartwig
- (3209) Loehr, Smith Zbarsky, Miele, Butler
- (3210) McCabe, Friedman-Wheeler
- (3211) Kurpad, Sutherland, Wilford
- (3212) Ploran, Overman, Lee, Masnick, Weingartner
- (3213) Robey
- (3214) Northern, Tauber, St. Hilaire, Carpenter
- (3215) Gretz, Smith, Maxwell, Huff
- (3216) Een, Zepeda, Butler
- (3217) Zepeda, Ortegren, Butler
- (3218) DeCaro, Thomas
- (3219) Guerrero, Wiley
- (3220) Canizales, Pan, Brabec, Bjork, Bjork
- (3221) Lo, Sahakyan
- (3222) Hays, Glick, Smith
- (3223) Lithander, Geraci, Karaca
- (3224) Zhou, MacLeod
- (3225) Griffin, Mielicki, Wiley

SATURDAY MORNING, NOVEMBER 16, 2019

8:00 AM-11:55 AM

Spoken Sessions (131-196)

Human Learning and Instruction I (131-136) 519 B

8:00-8:15 AM	Butler, Woodward
8:20-8:35 AM	Tullis, Goldstone
8:40-8:55 AM	Bjork, Brabec, Pan, Bjork
9:00-9:15 AM	Zawadzka, Zaborowska, Butowska
	Piątkowski, Hanczakowski
9:20-9:35 AM	Scullin, Gao, Ginty
9:40-9:55 AM	Blake, Fries, Son, Stigler

Divided Attention (137-142) 520 A

8:00-8:15 AM	Drew, Alonso, Vazquez, Tasevac, Williams
8:20-8:35 AM	Forrin, Huynh, Smith, Cyr, McLean, Siklos-
	Whillans, Risko, Smilek, MacLeod
8:40-8:55 AM	Strobach, Karbach
9:00-9:15 AM	Kavyani, Farsi
9:20-9:35 AM	Gronau, Avital-Cohen
9:40-9:55 AM	Klein, Feltmate, Hurst, Kopf, Gagnon

Judgment and Decision Making I (143-148) 520 C

8:00-8:15 AM	Eidels, Mullard, Love, Adam
8:20-8:35 AM	Kareev, Avrahami, Budescu
8:40-8:55 AM	He, Analytis, Bhatia
9:00-9:15 AM	Hinsz, Semanko
9:20-9:35 AM	Bernstein, Hamzagic, Mah, Derksen
9:40-9:55 AM	Nakamura

Letter/Word Processing I (149-153) 520 B

8:00-8:15 AM Lupker, Yang, Hino, Yoshihara, Nakayama, Xue 8:20-8:35 AM Kinoshita, Whiting

8:40-8:55 AM	Goh, Yap, Chee
9:00-9:15 AM	CONTENT, Chetail
9:20-9:35 AM	Chetail, Smejkalova

Individual Differences in Attention and Cognition (154-158) 518 A

8.00-8.15 AM	Brewer Robison
5.00-6.13 ANI	biewei, Robison
8:20-8:35 AM	Frischkorn, von Basitan, Souza, Oberauer 🕯
8:40-8:55 AM	Jarosz, Dygert
9:00-9:15 AM	White, Servant
9:20-9:35 AM	Mitroff, Porfido, Cox, Adamo

Concepts and Categories (159-163) 520 F

8:00-8:15 AM	Mueller, Hoffman, Klein, Alam, Mamun
8:20-8:35 AM	Nosofsky, Meagher, Sanders, Kumar
8:40-8:55 AM	Schloss, Rathore, Leggon, Lessard
9:00-9:15 AM	Yu, Carvalho, Chen
9:20-9:35 AM	Was, Baranski, Cochrac, Byrnes, Graham

Symposium III: Seeking Explicit Cognitive Processes in Animals (164-169) 517 D

10:00-10:15 AM Smith 10:20-10:35 AM Manns 10:40-10:55 AM Church 11:00-11:15 AM Hampton 11:20-11:35 AM Pepperberg 11:40-11:55 AM Schwartz

Metacognition (170-175) 520 B

10:00-10:15 AM Smith, Beda, Orr

10:20-10:35 AM Son, Hong, Kim, Lee, Kim 10:40-10:55 AM Fazio 11:00-11:15 AM Markant, Padro 11:20-11:35 AM Konishi, de Gardelle, Berberian, Sackur 11:40-11:55 AM Brashier, Ho, Hogue, Schacter

Cognitive Control III (176-181) 520 F

10:00-10:15 AM Mayr, Kikumoto
10:20-10:35 AM Matzke, Garton, Reynolds, Hinder, Heathcote
10:40-10:55 AM Raettig, Huestegge
11:00-11:15 AM Watter, Ptok
11:20-11:35 AM Hommel, Dignath, van Steenbergen, Ciardo, Wykowska, Eder
11:40-11:55 AM Otto, da Silva Castanheira, LoParco

Discourse Processes I (182-186) 520 C

10:20-10:35 AM Wolfe, Dandignac, Sullivan, Moleski, Reyna 10:40-10:55 AM Pardo, Bachert, Owczarek, Pauljohn, Trilone 11:00-11:15 AM Singer, Spear

11:20-11:35 AM Dahan 11:40-11:55 AM Keysar, Lau, Wu, Geipel

Emotion and Cognition (187-191) 519 B

10:20-10:35 AM Gallup, Gagnon, Eldakar 10:40-10:55 AM Colzato, Maraver, Hommel 11:00-11:15 AM Kozlik, Fischer, Maraver, Colzato 11:20-11:35 AM Lai, Mehl, Bulkes, Kumar, Ku 11:40-11:55 AM McBeath, Yu, Greenstein, Lobato, Patten, Glenberg

Reasoning and Problem Solving (192-196) 520 A

10:20-10:35 AM Starns, Cohen, Bosco, Lougee Rodriguez, Vazquez

10:40-10:55 AM Michal, Seifert, Shah

11:00-11:15 AM Mandel, Karvetski, Irwin

11:20-11:35 AM Kurtz, Snoddy

11:40-11:55 AM De Neys, Bago, Bonnefon

SATURDAY NOON, NOVEMBER 16, 2019 11:00 AM-1:30 PM Poster Session IV (4001-4216)

517 B

Divided Attention (4001-4013)

(4001) Künstler

- (4002) Thomson, Santacruz
- (4003) Schacherer, Hazeltine
- (4004) Castro, Heathcote, Strayer
- (4005) Cerisano, Crukley, Song, Humphreys, Watter
- (4006) Dai, Thomas, Taylor, Hyman
- (4007) Ward, Kusztos, Wooten, Marfeo, Fontes, Brunye, Hussey
- (4008) Labonté, Lamirande, Pozzi, Provost, Vachon
- (4009) Muir, Guyton, Gilmore, White
- (4010) Bednarek, Orzechowski, Przedniczek, Olszewska, Niewiarowski
- (4011) Kumar, Rouder
- (4012) Huestegge, Pieczykolan, Koch
- (4013) Lorentz, LaPointe, Rosner, Milliken

Bilingualism (4014-4030)

- (4014) Graham, Lavric
- (4015) Bruni, Chiarello
- (4016) Gullifer, Titone
- (4017) Anderson, Grundy, Barker, Bialystok
- (4018) Pan, Jared
- (4019) Yang, Reid, Katz
- (4020) Lei, Liu, Van Hell
- (4021) Morrison, Kamal, Taler
- (4022) Hoshino, Sanz
- (4023) Rossi, Nakamura
- (4024) Garcia, Wong, Cheung, Kroll, Botezatu
- (4025) Kleinman, Gollan
- (4026) Ahn, Gollan, Ferreira
- (4027) Gavino, Goldrick
- (4028) Takahesu Tabori, Pyers
- (4029) Hosier, Bradlow

(4030) Higby, Kroll

Cognitive Control II (4031-4044)

- (4031) Ashitaka, Shimada
- (4032) Jiang, Macnamara
- (4033) Bejjani, Tan, Egner
- (4034) Foerster, Kunde, Pfister
- (4035) Whitehead, Pfeuffer, Egner
- (4036) Skrotzki, Stone, Yang
- (4037) Lim, Rheem, Cho
- (4038) Liu, Egner
- (4039) Tae, Lee, An, Sohn
- (4040) Jurczyk, Fröber, Dreisbach
- (4041) Dreisbach, Jurczyk
- (4042) Sahakyan, Ding, Whitlock
- (4043) Whitlock, Chiu, Sahakyan
- (4044) Moss, Byers, Zhang, Mayr

Embodied Cognition (4045-4061)

- (4045) Nissenbaum, Repetto, Palafox, Romano, Costello
- (4046) Mason, Christman
- (4047) Iseki, Kitagami, Kawaguchi
- (4048) Gagnon, Gélinas, Blanchette
- (4049) King-Shepard, Kuo, Nokes-Malach
- (4050) Popović Stijačić, Filipović Đurđević
- (4051) Agauas, Thomas
- (4052) Teskey, Bub, Masson
- (4053) Bueno, Seigneuric, Megherbi
- (4054) Sullivan, Mason
- (4055) Solondaev, Koneva
- (4056) Hagen, Smith, Hilverman, Halvorson
- (4057) Teoh, Halvorson, Hilverman
- (4058) Oakes, Onyper
- (4059) Smith, Abrams

- (4060)Mogan, Wiemer, Kurby
- (4061)Wiemers, Redick

Judgment (4062-4075)

- (4062)Smelter, Calvillo
- LaCour, Davis (4063)
- Calvillo, Smelter, Punjabi, Avina (4064)
- (4065)Konovalova, Pachur
- Pan, Hayakawa, Marian (4066)
- Walker, Stange, Dixon, Koehler, Fugelsang (4067)Zou, Bhatia
- (4068)Umscheid, Galotti (4069)
- (4070)Boltz
- (4071)
- Kane, Grundy Chang, Delaney (4072)
- (4073)Suzuki, Ueno, Ishikawa, Kobayashi, Okubo, Nakai
- (4074)Miyazaki
- (4075)Olszewska, Falkowski, Conway, Jablonska, Sidoruk-Blach

Numerical Cognition (4076-4086)

- (4076)Clement, Moffat, Pratt
- Bowman, Faulkenberry (4077)
- (4078)Tuttle, Lanagan-Leitzel
- (4079)Williams, Xing, Barth
- Williams, Bradley, Barth, Patalano (4080)
- Kamekona-Mendoza, Ashcraft (4081)
- McGraw, Kaschak, Ganley (4082)
- Martis, LaCour, Davis (4083)
- (4084)Yang, He
- (4085)Lea, Sanford, Shaffer, Varma
- (4086)Xu, Chodorow, Valian

Cognition and Technology (4087-4095)

- Frame, Lopez, Myers, Stevens, Estepp, Boydstun (4087)
- Crabtree, Scott, Hopman, McKinney, LoTemplio, (4088)McDonnell, Strayer, Uchino
- (4089)Hamilton, Siler, Benjamin
- Rhee, Kim, Hahn (4090)
- (4091)Wieth, Francis, Helder
- (4092) Fisk
- Smith, Mulligan (4093)
- Lee, Kwon, Hahn (4094)
- (4095)Lochner, Duenser, Siriya, Heathcote

Discourse Processes (4096-4107)

- (4096)Cosgrove, Diaz
- Chia, Kaschak, Meltzer (4097)
- Larson, Fox Tree (4098)
- (4099)Drumm-Hewitt, Wright
- (4100)Navarro, Macnamara, Conway
- (4101)Nguyen, Guydish, Chowdhury, Fox Tree
- (4102)Kello, Schneider, Pardo, Coburn
- (4103)McCarthy, Allen, McNamara, Magliano
- (4104)Christofalos, Raney
- (4105)Harsch, Kendeou
- (4106)Zachary, Allen
- (4107)Long, Collins

Psycholinguistics II (4108-4123)

- (4108)Zaharchuk, Van Hell, Shevlin
- Meuter, Brassington (4109)
- Patalas, de Almeida (4110)
- Burnett, Geipel, Keysar (4111)
- Alexander, Sewell (4112)
- (4113)Dempsey, Liu, Christianson
- (4114)Lowder, Ryan, Opie, Kaminsky
- (4115)Sloggett, Rysling, Staub
- (4116)Grey, Liu, Zink, Van Hell
- (4117)Desroches, Kozera, Korade, Forest
- Rice, Tokowicz (4118)
- (4119)Gardner, Brown-Schmidt
- Rebei, Christianson (4120)
- (4121)McDonald
- (4122)Karimi, Diaz
- Faghihi, Garcia, Vaid (4123)

Autobiographical Memory (4124-4140)

- Emery, Godfrey (4124)
- (4125)Isurin, Buquoi
- (4126)Herrera, McDonough, Patihis
- (4127)Kaya-Kızılöz, Şimşek, Yüncü
- (4128)Tekcan, Küçüktaş
- Boduroglu, Bilge, Hacıbektasoglu, Tekcan (4129)
- (4130)Sanson, Wilson, Garry
- (4131)Burnell, Umanath, Garry
- (4132)Miller, Morris
- Mert, Tekcan (4133)
- (4134)Özbek, Bohn, Berntsen
- (4135)Gilmore, Quach, Kalinowski, Gotts, Schacter, Martin
- (4136)Briere, Collins
- (4137) Lockrow, Setton, Sheldon, Turner, Spreng
- (4138)West, Merck, Basile, Uribe, Hirst
- (4139)Wraga, Abramson
- Lalla, Sheldon (4140)

Cognitive Skill Acquisition (4141-4145)

- Osman, Schafer, Ng (4141)
- (4142)Smith, Basak
- Wells, Mayer, MacNamara, Plass, Homer (4143)
- (4144)Harrison, Pan, Brabec, Giebl, Bjork, Bjork
- (4145)Moreau

Test Effects on Learning and Memory (4146-3202)

Corral, Carpenter, St. Hilaire, Hickman, Reese, (4146)Benshoof

Frankenstein, Sklenar, McCurdy, Urban Levy,

- (4147)Patra, Traut, Stabile, Middleton
- (4148)Bolte, Neely
- (4149)Carvalho, Marmurek
- (4150)Smith, Ell

(4153)

(4154)

(4155)

(4156)

(4157)

(4158)

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(4151)Lamotte, Izaute, Darnon (4152)Vaughn

Myers, Rhodes

Vitrano, Neely

Leshikar

Wear

Endres, Renkl, Carpenter

Tekin, Uner, Roediger

- (4159)Fiechter
- James, Storm (4160)
- Towner, Metcalfe (4161)
- Doolen, Radvansky (4162)
- Boustani, Owens (4163)

Human Learning and Instruction II (3203-3225)

- (4164)Davis, Peterson
- (4165)Kang, Eglington, Lu, Schuetze, Huaco, Hinterstoisser
- (4166)Imundo, Pan, Zung, Bjork, Bjork
- Tauber, Babineau, Neely (4167)
- Manley, Chan, Ahn (4168)
- Foss, Pirozzolo (4169)
- (4170)Hausman, Rhodes
- (4171)Hornburg, O'Day, Karpicke
- (4172)St. Hilaire, Carpenter
- Uner, Tekin, Gouravajhala, Anderson, McDaniel, (4173)Roediger
- (4174)Blalock, Harris
- Besken, Solmaz (4175)
- Pavlik Jr., Cao, Eglington (4176)
- Newman, Bego, DeCaro (4177)
- O'Day, Karpicke (4178)
- (4179)Pillai, Loehr, Yeo, Fazio (4180)Eri
- (4181)Briere, Faul, Marche

Working Memory II (4182-4191)

- Cushen, Smith (4182)
- Schor, Brodersen, Gibson (4183)
- (4184)Schneider, Vergauwe, Camos
- (4185)Weaver, Trane, Moon, Buschkuehl, Carbone, Borella, Flueckiger, Jaeggi Werner, Parks (4186)
- (4187) Leem, Park, Kang

- Zhao, Hubbard, Turner, Motes, Rypma (4188)
- (4189)Sarr, Gagnon
- (4190)Konstantinou, Bahrami, Lavie
- (4191)Vergauwe, Carlos Gonzalez-Garcia, Wisniewski, Langerock, Brass

Sensation and Perception (4192-4201)

- (4192)Kasos, Kasos, Csirmaz, Zimonyi, Vikor, Szekely
- (4193)Maezawa, Kawahara
- Cromley, Cohen (4194)
- (4195)Christman, Hu
- (4196)McFeaters, Voyer
- (4197)Cameron, Møller
- (4198)Rosenbaum, Bobadilla, Sturgill
- (4199)Plomp, Behm, List
- (4200)Bazen, Ziat, de Grosbois, Misse, Cabe
- (4201)Gaboury, Murray, Angel, Ziat

Statistics and Methodology (4202-4216)

- (4202)Haaf
- (4203)Rabe, Chandra, Krügel, Seelig, Engbert
- (4204)Kieslich, Palfi, Szaszi, Wulff, Aczel
- (4205)Lim, Kuntzelman, Johnson
- (4206)Iwama, Wirzberger, Lieder
- (4207)Henninger, Kieslich
- (4208) Meyers, Walker, Fugelsang, Koehler
- (4209)Botella, Suero, Durán, Privado, Blazquez
- Hout, Richie, White, Bhatia (4210)
- (4211)Nakamura, Majima
- (4212)Plant
- (4213)Levi, Rotello, Goshen-Gottstein
- (4214)Brooks, Zoumpoulaki, Bowman
- (4215) Cunningham, Buchanan, Crain, Johnson, Stash
- Friedman-Wheeler, Ibrahim, Appelbaum, Belmont, (4216)Groshon, Klock, Wiltse, Yarrish

SATURDAY AFTERNOON, NOVEMBER 16, 2019 1:30 PM-5:25 PM

Spoken Sessions (197-262)

Symposium IV	: Beyond a Single Participant: Interactive	1:50-2:05 PM	Horowitz, Trevino, Czarniecki, Turkbey,
Social Cogniti	on in Dyads and Groups (197-202) 517 D		Choyke
1:30-1:45 PM	Ristic	2:10-2:25 PM	Intraub, Du
1:50-2:05 PM	Enns	2:30-2:45 PM	Searston, Sullivan
2:10-2:25 PM	Loehr, Christensen	2:50-3:05 PM	Brockmole, Krasich, Huffman
2:30-2:45 PM	Gobel	3:10-3:25 PM	Wolfe, Wu
2:50-3:05 PM	Capozzi, Ristic		
3:10-3:25 PM Panel		Judgment and Decision Making II (215-219) 520 C	
		1:30-1:45 PM	Marsh, Zheng, Nickerson, Kleinberg
Recognition Memory (203-208) 520 A		1:50-2:05 PM	Horn, Oehler, Wendt
1:30-1:45 PM	Kuhlmann, Symeonidou	2:10-2:25 PM	Budescu, Himmelstein
1:50-2:05 PM	Goshen-Gottstein, Levy, Rotello	2:30-2:45 PM	Thoma, Edgcumbe, Nitsche, Rivolta
2:10-2:25 PM	Maxcey	2:50-3:05 PM	Cohen, Campbell, Cromley
2:30-2:45 PM	Shiffrin, Busey, Cao, Nosofsky, Qurashi, Zhao		
2:50-3:05 PM Dubé Human Learni		ng and Instruction II (220-224) 520 B	
3:10-3:25 PM	Brainerd, Bialer, Chang, Nakamura	1:30-1:45 PM	Healy, Kole, Schneider, Barshi
		1:50-2:05 PM	Finn
Attention and	Scene Processing (209-214) 519 B	2:10-2:25 PM	Rottman, Willett
1:30-1:45 PM	MacInnes, Gorina, Zhulikov, Merzon, Sofia,	2:30-2:45 PM	Pastötter, Bäuml, Frings

2:50-3:05 PM

Metcalfe, Huelser

Multisensory Perception (225-229) 520 F

•	-
1:30-1:45 PM	Gomez, Baciero, Uribe, Isler, Guillen
1:50-2:05 PM	Wang, Widdowson, Yoon, Hovakimyan
2:10-2:25 PM	Wilbiks, Beatteay
2:30-2:45 PM	Hirst, Setti, Kenny, Newell
2:50-3:05 PM	Colonius, Diederich

Visual Search (230-235) 520 B

3:30-3:45 PM	Olivers, Ort, ten Cate, Eimer, Fahrenfort
3:50-4:05 PM	Cave, McNamara, Chang, Donnelly
4:10-4:25 PM	Vecera, Stilwell
4:30-4:45 PM	Papesh, Guevara Pinto
4:50-5:05 PM	Gil-Gómez de Liaño, Wiegand, Wolfe
5:10-5:25 PM	Huber, Huszar

Discourse Processes II (236-241) 520 C

3:30-3:45 PM	Kaakinen
3:50-4:05 PM	Gerrig, Mumper
4:10-4:25 PM	Chambers, Thacker, Graham
4:30-4:45 PM	Mertens, de Ruiter
4:50-5:05 PM	Sagi
5:10-5:25 PM	Tuller

Judgment (242-247) 520 F

3:30-3:45 PM	Anderson, Leventhal, Jaffee
3:50-4:05 PM	Farrell, Fastrich
4:10-4:25 PM	Wedell, Hayes, Rashotte
4:30-4:45 PM	Link

4:50-5:05 PM	Tangen, Searston, Kent
5:10-5:25 PM	Barth, Brew, Clark, Feingold-Link

Recognition Memory II (248-252) 518 A

3:50-4:05 PM	Knowlton, Schorn, Hennessee, Patterson
	Castel
4:10-4:25 PM	Bowen, Marchesi, Kensinger
4:30-4:45 PM	Higham
4:50-5:05 PM	Koop, Kauffman, King
5:10-5:25 PM	Moreland

Working Memory: Neural Mechanisms and Individual Differences (253-257) 520 A

3:50-4:05 PM	Woodman, Wang, Rajsic
4:10-4:25 PM	Osaka, Kaneda, Azuma, Yaoi, Shimokawa,
	Osaka
4:30-4:45 PM	Martin, Yue
4:50-5:05 PM	Service, Lahti-Nuuttila, Kunnari, Smolander
	Arkkila, Laasonen
5:10-5:25 PM	Plancher, Fanuel, Harding, Shiffrin

Reading (258-262) 519 B

3:50-4:05 PM	Luke
4:10-4:25 PM	Olkoniemi, Johander, Kaakinen
4:30-4:45 PM	Andrews, Veldre, Wong
4:50-5:05 PM	Protopapas, van Viersen, Ziaka, Parrila, de
	Jong, Georgiou
5:10-5:25 PM	Reichle

SATURDAY EVENING, NOVEMBER 16, 2019

4:00 PM-7:30 PM

Poster Session V (5001-5210)

517 B

Sensation and Perception: Vision (5001-5020)

(5001)	Guillory, Grosman, McLaughlin, Isenstein,
	Wilkinson, Siper, Kolevzon, Wang, Buxbaum, Foss-
	Feig
(5002)	Haase, Fisk
(5003)	Lintz, Johnson
(5004)	Zosky, Berryhill, Haigh, Dodd
(5005)	Zhou, Ishiguchi
(5006)	Dopkins, McIntire
(5007)	Mueller, Utz, Carbon, Strobach
(5008)	Gingras, Goulet, Robinson, Plouffe-Demers,

- Massicotte, Fiset, Blais
- (5009) Dubbelde, Shomstein
- (5010) Wnuczko, Kennedy
- (5011) Charbonneau, Duncan, Royer, Dugas, Lalonde-Beaudoin, Blais, Fiset
- (5012) Di Lollo, Cork, Jankovic, Spalek
- (5013) Sass
- (5014) Zhou, Zhou, Liu, Feng
- (5015) Doyle, Ferber
- (5016) Avci, Boduroglu
- (5017) Kleider-Offutt, Meacham, Martin, Capodanno
- (5018) Sterling, Berkhout
- (5019) Craver-Lemley, Reeves
- (5020) Sadr

Attention in Visual Search (5021-5035)

- (5021) Burnham
- (5022) Cox, Adamo, Porfido, Kravitz, Mitroff
- (5023) Talcott, Gaspelin
- (5024) Ghirardelli, Fraser, Monthie, Rubin, Woodson, Lion, Willie, Brodsky, Mooi, Struewing, Price, Vacher
- (5025) Thornton, Horowitz
- (5026) Morozov
- (5027) Saiki, Kumakiri
- (5028) Ma, Abrams
- (5029) Kim, Lee, Anderson **Q**
- (5030) Poletiek, Aernoudts
- (5031) Gillmore, Dickerson, Davis, Millard
- (5032) Nicora, Alonso, Tasevac, Orrego, Drew
- (5033) Maturi, Sheridan
- (5034) Paquette, Bohil, Schmidt
- (5035) Dickerson, Gillmore, Davis, Millard

Spatial Cognition (5036-5048)

- (5036) Muto, Gondo, Inagaki, Masui, Nakagawa, Ogawa, Onoguchi, Ishioka, Numata, Yasumoto
- (5037) Gunalp, Hegarty, Chrastil
- (5038) Burte, McCall, Hutton, Taylor
- (5039) Garcia, Faghihi, Febre, Vaid
- (5040) Müsseler

- (5041) Lim, Cherep, Kelly, Ostrander, Gilbert
- (5042) von Salm, Bolzius, Müsseler
- (5043) Wang, Li, Yang
- (5044) Barhorst-Cates, Creem-Regehr, Stefanucci
- (5045) Houck, Timmons, Philbeck
- (5046) Cheng, Ling, Stern, Huang, Chrastil
- (5047) Carpenter, Johnson, Gilliland, Melo, Nardi
- (5048) Snytte, Elshiekh, Pasvanis, Rajagopal, Olsen, Rajah

Event Cognition (5049-5057)

- (5049) Barnhart, Krupa, Ruediger, Duckert
- (5050) Pitts, Bailey, Wisniewski
- (5051) Logie, Donaldson
- (5052) Kurby, Bailey, Smith, Stewart, Merle, Evans
- (5053) Katikhina, Lai
- (5054) Luan
- (5055) Moeller, Frings
- (5056) Saad, Rothrock, De Luna, Musolino, Hemmer
- (5057) Dowling, Hunter, Leboe-McGowan, Leboe-McGowan

Concepts and Categories (5058-5073)

- (5058) Wiemer, Mogan
- (5059) Yang
- (5060) Silliman, Kurtz
- (5061) Seo, Kalish
- (5062) Little, Longares
- (5063) Deng, Savoie, Michaud, Stevenson, Driscoll, Smith, Helie, Ell
- (5064) Church, Jackson, Lopata, Mercado
- (5065) Zaki, Bergey, Salmi, Rich
- (5066) Clapper, Garthwaite, Ventura, Appel, Montejano
- (5067) Matsuka, Kawabata, Xu
- (5068) Patterson, Kurtz
- (5069) Roark, Holt
- (5070) Meacham, Sosnowski, Brosnan, Kleider-Offutt
- (5071) Spiridonov, Loginov, Selivanova
- (5072) Zeng, Thompson-Schill
- (5073) Blais, Brewer, Cohen

Reasoning and Problem Solving (5074-5098)

- (5074) O'Malley, Valian
- (5075) Ng, Beeman
- (5076) Andreotta, Hurlstone, Boschetti, Farrell, Paris, Walker
- (5077) Pyo, Moon, Kim, Kim
- (5078) Raoelison, Thompson, De Neys
- (5079) Koshino, Ricco, Bonsel, Ware
- (5080) Lazareva, Chistopolskaya, Kutuzova
- (5081) Dorfman, Grossmann, Oakes, Vohs, Santos, Scholer
- (5082) Quartararo, Thompson
- (5083) Xie, Navarro, Hayes
- (5084) Bell, Bailey
- (5085) Langston, Bibb, Kah
- (5086) Kershaw, Simmons, McKay
- (5087) Newman, Thompson
- (5088) Vladimirov, Makarov
- (5089) Petseva, Kozlov, Gorbunova, Smirnitskaya
- (5090) Zhao, Roskos, Fant
- (5091) Geary, Thompson
- (5092) George, Mielicki, Wiley

- (5093) Kiyokawa, Dienes
- (5094) Korovkin, Oganesyan, Savinova, Morozova, Luneva
- (5095) Grunewald, Riley, McCullough, Paller, Beeman
- (5096) Wingert, Redick, Brewer
- (5097) Raden, Jarosz
- (5098) Ellis, Brewer

Sentence Parsing and Semantics (5099-5110)

- (5099) Al-Azary, Gagne, Spalding
- (5100) Calcaterra
- (5101) Hendel, Dickinson, Roy-Charland
- (5102) Ashwill, Spieler
- (5103) Troutman, Sandberg, Diaz
- (5104) Harati, Westbury
- (5105) Chaigneau, Canessa
- (5106) Kumar, Balota, Steyvers
- (5107) Lai, Federmeier
- (5108) Ovans, Novick, Kim
- (5109) Huang, Staub
- (5110) James, Chacón

Speech Perception II (5111-5121)

- (5111) Luthra, Steiner, Magnuson, Myers
- (5112) AuBuchon, Monzingo, Bosen
- (5113) Failes, Hawks, Sommers, White
- (5114) Bowen, Brown, Childers, Granger
- (5115) Turner, Bradlow, Cole
- (5116) Tokac, Mungan, Ozsoy
- (5117) Van Hedger, Heald, Nusbaum, Batterink, Davis, Johnsrude
- (5118) Noe, Fischer-Baum
- (5119) Strand, Brown
- (5120) Shatzer, Garner, Pitt
- (5121) Nagle

Implicit Memory (5122-5126)

- (5122) Kramer, Cox, Mitroff, Kravitz
- (5123) Mitchel, Gosling, Slagus, Kong
- (5124) Millar, Lassner, Balota
- (5125) Graham, Greve, Al-Harthy, Was
- (5126) Caulfield, Flynn, Kan

Metamemory and Metacognition (5127-5156)

- (5127) Geller, Carpenter
- (5128) Jia, Rong
- (5129) Wissman

(5134)

(5135)

(5136)

(5137)

(5138)

(5139)

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(5141)

(5142)

(5143)

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(5130) Jaeger, Hildenbrand, Sanchez

Lipowski, Canda, Pyc

Robey, Castillo, Ha, Kerlow, Lubana, Tesfa,

Wang, Yan, Muenks, Rosenzweig

Hartwig, Rohrer, Dedrick, Cheung

Yamaguchi, Takahashi, Kaneko

Witherby, Tauber, Northern, King

- (5131) McCullough, Ariel
- (5132) Saenz, Smith, Leontyev

Green, Serra

Dougherty

Madison, Fulton

Chang, Brainerd

Siegel, Schwartz, Castel

- (5144) Salovich, Cope, Rapp
- (5145) Jalbert, Newman, Schwarz, Ly
- (5146) Kornell, Fiechter
- (5147) Lipko-Speed, Buchert, Laws, Kearney, Wagaman, Wolf, Gumbs, Morgan, Scott, Scott, Frattini
- (5148) Coane, Umanath, Cimenian, Chang
- (5149) Laursen, Mitton, Skinner, Fiacconi
- (5150) Hanson, Yan
- (5151) Scheibe, Sitzman
- (5152) Stevens, Pierce
- (5153) Undorf, Bröder
- (5154) Williams, Eardley
- (5155) FitzGibbon, Fastrich, Lau, Murayama
- (5156) Penalver, Glynn, Douglass, Yoshida, Golder, Hutton

Recall II (5157-5176)

- (5157) Finch, Eakin
- (5158) Flurry, Eakin
- (5159) Kazanas, Fernandes, Altarriba
- (5160) Sozer, Hirst
- (5161) Persaud
- (5162) Gallant, Stevanovski
- (5163) Newberger, Yamashiro, Sozer, Brown, Hirst
- (5164) Whillock, Meade, Lucas
- (5165) Shaffer, Spaventa, Zerr, McDermott **Q**
- (5166) Wilson, Criss
- (5167) Scheurich, Palmer, Sheldon
- (5168) Jang, Lee
- (5169) Leppanen, Navangul, Feder, Jones, Kim
- (5170) Cutler, Brown-Schmidt, Polyn
- (5171) Todorovic, MacLeod
- (5172) Rawlinson, Kelley
- (5173) Shepherdson
- (5174) Hong, Fazio, Polyn
- (5175) Delaney, Gilbert, Racsmany
- (5176) Bucknoff, Metcalfe

Recognition Memory II (5177-5191)

(5177) Yang, Lin, Zhou

- (5178) Prull, Liu, Higdon, Calo
- (5179) Bangert, White
- (5180) Fallow, Lindsay
- (5181) Curl, White, Criss
- (5182) McAdoo, Gronlund
- (5183) Li, Greenwald, Lindsay, Kantner
- (5184) Lee, Fernandes
- (5185) Adams, Bodner, Williams
- (5186) Heisick
- (5187) Szollosi, Racsmany
- (5188) Aytaç, Kılıç
- (5189) Huebert, Cleary
- (5190) Hopper, Starns
- (5191) Chakravarty, Chen, Caplan

Working Memory III (5192-5210)

- (5192) Piątkowski, Zawadzka, Hanczakowski
- (5193) Ueda, Huang, Shen, Yeh, Saito
- (5194) Kelley, Walts, Uribe, Tcaturian, Strejc, Keller, Gonzalez
- (5195) Ngiam, Brissenden, Awh
- (5196) Krasnoff, Oberauer 🔒, Singmann
- (5197) Magen, Hai-Ezra, Koor
- (5198) Bae, Luck
- (5199) Tian, Dial, Martin, Fischer-Baum
- (5200) Morrison, Richmond, Duffy, Hatcher, Thornton
- (5201) Mathy, Gauvrit
- (5202) Mathis, Welch
- (5203) Labaronne, Plancher
- (5204) Bartsch, Oberauer **Q**
- (5205) Cotton, Ricker
- (5206) Lazartigues, Lavigne, Aguilar, Mathy
- (5207) Pahor, Stavropoulos, Collins, Moon, Jaeggi, Seitz
- (5208) Gokce, Zinchenko, Annac, Conci, Geyer
- (5209) Lilienthal
- (5210) Higo, Okamoto, Osaka

Business, Awards, and Happy 60th Birthday Champagne Celebration 524 A

SUNDAY MORNING, NOVEMBER 17, 2019 8:00 AM-11:55 AM Spoken Sessions (264-321)

Attention to Features and Objects (264-269) 519 A

 8:00-8:15 AM
 Anaki

 8:20-8:35 AM
 Curby, Kinlay

 8:40-8:55 AM
 Chen, Basu, Cave, Suresh, Wiltshire

 9:00-9:15 AM
 Matsukura

 9:20-9:35 AM
 Geng, Won

 9:40-9:55 AM
 Gopher, Bonder

Speech Perception (270-275) 518 A

8:00-8:15 AM	Van Engen, Brown, McLaughlin, Strand
8:20-8:35 AM	Ingvalson, MacPherson, Lansford
8:40-8:55 AM	Mattys, Chiu, Rakusen
9:00-9:15 AM	Remez, Marrero, Caballero
9:20-9:35 AM	Pattamadilok, Bolger, Dubarry
9:40-9:55 AM	Samuel

Working Memory I (276-281) 519 B

- 8:00-8:15 AM Ravizza, Liu
- 8:20-8:35 AM Ward, Cortis Mack, Doherty, Knight, Loaiza
 8:40-8:55 AM Loaiza, Souza
 9:00-9:15 AM Camos, Belletier, Doherty, Jaroslawska, Rhodes, Cowan, Naveh-Benjamin, Barrouillet, Logie
 9:20-9:35 AM Barrouillet, Gorin, Camos
 9:40-9:55 AM Conway, Schmank, Goring, Kovacs

 Motor Control (282-286) 520 C
 8:00-8:15 AM Herbort, Kirsch, Kunde
- 8:20-8:35 AM Juravle, Colino, Binsted, Farnè
 8:40-8:55 AM Holloway, Nañéz Sr.
 9:00-9:15 AM Bortfeld, Rahimpour, Pollonini, Comstock, Balasubramaniam



9:20-9:35 AM Arexis, Ladoy, Maquestiaux

Statistics and Methodology (287-291) 520 F

Mordkoff
Chechile
Davis-Stober, Regenwetter
Wixted, Wilson, Harris
Dougherty, Horne

Spatial Cognition II (292-296) 518 B

8:00-8:15 AM	Fostick, Babkoff, Fink
8:20-8:35 AM	Wilke
8:40-8:55 AM	Minear, Priest, Barberis, Alden, McClure,
	Milbradt
9:00-9:15 AM	Flombaum, Yang
9:20-9:35 AM	Semizer, Yu, Wan, Balas, Rosenholtz

Letter/Word Processing II (297-302) 520 C

10:00-10:15 AM Dumay, Nash
10:20-10:35 AM Keuleers, Qin
10:40-10:55 AM Adelman, Harvey, Trifonova
11:00-11:15 AM Tao, Healy
11:20-11:35 AM Rastle, Jowett, Taylor, Auer, Lingnau
11:40-11:55 AM Snell, Grainger

Decision Making II (303-308) 520 F

10:00-10:15 AM Luhmann, Loatman 10:20-10:35 AM Rey, Le Goff, Abadie, Courrieu 10:40-10:55 AM Paruzel-Czachura, Białek 11:00-11:15 AM Livesey, Chow, Yang 11:20-11:35 AM Regenwetter, Mueller-Trede 11:40-11:55 AM Prike, Bijak, Higham

Metamemory and Cognition (309-311) 519 A

10:20-10:35 AM Double, Birney 10:40-10:55 AM Halamish, Stern 11:00-11:15 AM Aguilar-Lleyda, Konishi, Sackur, De Gardelle

Working Memory II (312-316) 519 B

10:20-10:35 AM Mizrak, Oberauer Q
10:40-10:55 AM Monsell, Graham
11:00-11:15 AM Voyer, Saint-Aubin, Altman, Gallant
11:20-11:35 AM Shoval, Makovski
11:40-11:55 AM deBetencourt, Keene, Awh, Vogel

Bilingualism (317-321) 518 A

10:20-10:35 AM Declerck, Wen, Snell, Meade, Grainger 10:40-10:55 AM Lambelet 11:00-11:15 AM Filipović Đurđević, Feldman 11:20-11:35 AM Li, Fadlon, Gollan, Prior 11:40-11:55 AM Timmer, Costa

P	NOTES

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Opening Session/Keynote Address Room 517 D, Thursday Evening, 7:30 PM Judith F. Kroll, University of California, Irvine Bilingualism Reveals the Networks that Shape the Mind and Brain Cognitive Aging

Opening Reception Immediately Following Keynote Room 517B

Cognitive Aging 520 A, Friday Morning, 8:00-9:40 AM Chaired by Martin Conway, City University of London

8:00-8:15 AM (1)

Age-related Changes in Episodic Memory. MARTIN A. CONWAY, *City University of London*, SHAZIA AKHTAR, *University of Hertfordshire* – Previous studies have demonstrated a detrimental age effect on episodic memory compared to semantic memory. The aim of the present study was the assessment of an age effect on the episodicity, i.e., content, of autobiographical memories. Over 10,000 specific autobiographical memories were sampled across a wide age range. Each memory was scored for episodic and semantic content. It was found that episodic memory content systematically decreased with age whereas semantic knowledge increased. A positivity effect was also observed in which memories increased in positive emotion with increasing age. Email: Martin A. Conway, martinconway1@mac.com

8:20-8:35 AM (2)

Age Differences in Anticipated Emotions for Future Life Events. WANDI BRUINE DE BRUIN, University of Leeds, SIMON MCNAIR, The Behavioural Insights Team, JONELL STROUGH, West Virginia University - Making decisions involves anticipating emotional responses to future life events. Most studies of anticipated emotions have been conducted with college students, who tend to anticipate relatively intense emotions for future events. Age differences in anticipated emotions remain largely unexplored, but theories of aging suggest that older adults seek to optimize experienced emotions and to avoid the physical stress of intense negative emotions. In a national UK life span sample (N=765), we found that older adults anticipated less negative emotions than did younger adults, independent of whether they were asked to consider future life events of negative, positive or undefined valence. These findings held even after accounting for the finding that older adults also reported experiencing less negative emotions at baseline. Furthermore, older adults were more likely than younger adults to report emotion regulation tendencies that were associated with anticipating less negative emotions, such as savoring positive aspects of the future, and avoiding rumination. Our findings align with theories of aging, and have implications for helping adults of all ages to manage their anticipated emotions when making decisions about the future. Email: Wandi Bruine de Bruin, w.bruinedebruin@leeds.ac.uk

8:40-8:55 AM (3)

Age-related Changes in Amplitude, Latency, and Specialization of ERP Responses to Faces and Objects. ISABELLE BOUTET, DHRASTI SHAH, and CHARLES A. COLLIN, University of Ottawa, STEFAN BERTI, MALTE PERSIKE, and BOZANA MEINHARDT-INJAC, Johannes Gutenberg University Mainz - Aging is associated with a decline in face processing abilities. Several studies have examined putative underlying mechanisms (reviewed by Boutet et al., 2015). However, conclusions arising from behavioural studies are often inconsistent with those arising from imaging studies. Moreover, few studies have included non-face objects, making it difficult to determine whether aging is particularly detrimental for face processing or has a more general impact on higherorder visual processing. To address these issues, we measured event-related potentials (ERPs) elicited during sequential matching of faces and watches. Holistic processing was measured using the context congruency paradigm (Meinhardt-Injac, 2013) whereby participants matched the internal features of stimuli while the external features were either congruent or incongruent. For faces, age-related differences were found for P100, N170 and P200 ERPs. For watches, age-related effects were found for N170 and P200 ERPs. Older adults showed less lateralized and less selective N170 responses to faces. We conclude that age-related differences in face processing arise during early perceptual processing and that ERPs can reveal de-differentiation of specialized face networks. Email: Isabelle Boutet, iboutet@uottawa.ca

9:00-9:15 AM (4)

Rapid Perceptual Learning and Individual Differences in the Recognition of Rapid Speech in Younger and Older Adults. KAREN BANAI, LIMOR LAVIE, and TALI ROTMAN, University of Haifa - Perceptual learning (PL) operates across the lifespan, but its role in speech and language beyond infancy is not well understood. Now we ask whether rapid PL can explain unique variance in the recognition of natural fast speech once the contribution of other variables is accounted for. We tested the recognition of very fast speech (FS) in young adults (YA, n = 40) and in older adults with age-related hearing loss (OA, n = 45). Rapid PL was estimated using time-compressed speech (speech rate was adjusted for age/hearing effects). Hearing, verbal memory and attention capacity were also assessed. OA recognized FS less accurately than YA (95% CI: 31-43% vs. 84-88%). Rapid PL was also reduced in OA. Nevertheless, in both groups, learning accounted for unique variance in FS recognition. In YA, rapid PL was the only significant predictor (R² >15%). In OA, both rapid PL and verbal memory accounted for significant unique variance in FS recognition (5% and 3%, respectively). These findings suggest that perceptual learning may support the recognition of perceptually difficult speech and that age/hearing related declines in learning may partially explain why older adults are disproportionately affected by rapid speech rates.

Email: Karen Banai, kbanai@research.haifa.ac.il

9:20-9:35 AM (5)

A Longitudinal Study of Visual Perspective-Taking Across the Lifespan. VICTORIA E.A. BRUNSDON, ELISABETH E.F. BRADFORD, and HEATHER J. FERGUSON Q, University of Kent - Successful social interactions depend on our ability to take other people's perspectives. Even though adults can rapidly and accurately compute their own and other people's perspectives, they still experience difficulties when another person's viewpoint conflicts with their own. This study explored the longitudinal associations between visual perspective-taking abilities and executive functions across the lifespan. Participants completed a level 1 visual perspective-taking task and four executive function tasks to measure inhibition, working memory, set-shifting and planning, at two time points (~2.5 years apart). We considered how individual differences in executive functions may underlie the degree to which interference is experienced from the irrelevant perspective when perspectives are in conflict (i.e., egocentric and altercentric interference). At time 1, working memory and set-shifting predicted increased egocentric interference. Additional analyses established the longitudinal associations between perspective-taking abilities and components of executive function.

Email: Victoria Brunsdon, v.e.a.brunsdon@kent.ac.uk

Attention Capture 520 B, Friday Morning, 8:00-10:00 AM

Chaired by Ira Hyman, Western Washington University

8:00-8:15 AM (6)

Repeated Inattentional Blindness in a Divided Attention Tracking Task. IRA E. HYMAN and THOMAS W. HYMAN, Western Washington University - Research concerning inattentional blindness generally only provide a single trial with an unusual stimulus. The underlying assumption is that once people are aware that unusual events occur, they watch for those events while maintaining their performance on their primary task. But in everyday experiences, such as driving or walking, people may miss unusual objects and events when they know such events may occur. We investigated repeated inattentional blindness using a divided attention task. Participants engaged in a selective tracking task. On some trials, an unusual object moved through the display. Participants were informed that unusual objects would sometimes appear. We have investigated how various features that are critical for visual search also influence attention capture in this repeated inattentional blindness method.

Email: Ira Hyman, ira.hyman@wwu.edu

8:20-8:35 AM (7)

Top-Down Contributions to Attention Shifting and Disengagement in Memory-Based Attention Orienting. MOTONORI YAMAGUCHI, *University of Essex* – Two separate systems are thought to control spatial attention; one that is driven by a goal and the other that is driven by stimuli. Although the goal- and stimulus-driven systems follow different general principles, seemingly automatic stimulus-driven attention capture depends on top-down factors. The present study explored the mechanism by which the goal-driven system influences the stimulus-driven system by testing top-down contributions to two components of attention orienting, shifting and disengagement. The method involved memory-guided attention orienting in a prosaccade task, in which a temporal gap between fixation offset and target onset was manipulated (i.e., gap task). The first experiment demonstrated the top-down contribution to attention shifting. The second experiment failed to find the top-down contribution to attention disengagement, but the subsequent experiments showed that the top-down contribution to disengagement depended on the utility of short-term memory item in guiding attention toward the target. Therefore, short-term memory accelerated shifting of attention toward the target and impaired disengagement from the fixation.

Email: Motonori Yamaguchi, cog.yamaguchi@gmail.com

8:40-8:55 AM (8)

Capture by Abrupt Onset is Mediated by Top-Down Processes. YEHOSHUA TSAL, Tel Aviv University, RICARDO MAX, New York University - Capture by abrupt onsets is defined as the epitome of bottom-up processing. Here we show that the expectation for a task-irrelevant abrupt onset at a given location results in processing prioritization of that location even without an actual abrupt onset. Critically, such an effect cannot be defined as bottom-up because no capturing stimulus is presented. We propose that the phenomena described as bottom-up capture of attention by exogenous stimuli derives from evolution-based all-pervasive "mental programs" that direct the attentional system to seek out dynamic discontinuities (even if detrimental to task performance) which are most relevant in signaling significant changes in the environment. Thus, we propose that the competition for attentional priority is not between top-down and bottom-up processes, but rather between voluntary top-down patterns dedicated to achieve best task performance and involuntary top-down patterns reflecting phylogenetic or ontogenetic history that may be inconsistent with the current goals of the observer.

Email: Yehoshua Tsal, jehoshua@tauex.tau.ac.il

9:00-9:15 AM (9)

Experience-Driven suppression of Irrelevant Distractor Locations is Context Dependent. ANDREW B. LEBER and AYALA S. ALLON, Ohio State University (Presented by Andrew Leber) - Two related phenomena have attracted much recent interest: experience-driven attention and attentional suppression. Recent work has even focused on the interaction of the two, demonstrating that participants suppress locations containing frequent appearances of salient, irrelevant distractors (e.g., Wang & Theeuwes, 2018). What mechanism drives such suppression? A low-level "selection history account" is based simply on the biased accumulation of distractor rejections at one spatial location. A high-level "context-dependent control account" instead posits a control mechanism informed by associative learning, which flexibly applies suppression based on current task relevance. We modified Wang & Theeuwes's paradigm, superimposing a search task on background scenes. Critically, forest scenes were paired with one high-probable distractor location; city scenes were paired with another. When we ensured participants processed the scene, they preferentially suppressed the high-probable distractor locations associated with the respective scenes. These results support contextdependent control and prompt broader consideration for how experience guides attention.

Email: Andrew Leber, leber.30@osu.edu

9:20-9:35 AM (10)

Statistical Regularities Bias Overt Selection: Evidence for Proactive and Reactive Suppression. JAN THEEUWES, Vrije Unversiteit Amsterdam - Wang and Theeuwes (2019) showed less capture by a salient singleton when it appeared at a high likely than at a low likely location. This effect resulting from statistical learning, can be due to either proactive suppression (suppression before display onset, preventing capture) or reactive suppression (suppression after attention has been directed to that location). To test these alternatives, we used an eye movement version of the additional singleton task where the distractor was presented more often at one location than other locations. Consistent with the proactive suppression hypothesis, we found that fewer saccades landed at the high-probability distractor location (suggesting less capture). However, we also found evidence for reactive suppression: the eyes were faster to disengage from the high-likely distractor location than from the low-likely location. The current findings provide evidence that suppression can be the result of both proactive and reactive suppression.

Email: Jan Theeuwes, J.Theeuwes@vu.nl

9:40-9:55 AM (11)

Experiencing Monetary Scarcity Enhances Value-Driven Attention Capture. JANE RAYMOND and DANIEL DODGSON, University of Birmingham, MARY MACLEAN, University of California, Santa Barbara - Visual stimuli previously associated with monetary rewards can be especially distracting when later presented as irrelevant items in visual search displays. Here, we asked whether such value-driven attention capture (VDAC) depends on one's current motivational state or is activated automatically. All participants engaged in a wellstudied value-learning task and then completed a simple visual search task with value-laden stimuli as distractors (to measure VDAC). Between learning and test, participants played a virtual shopping game with either a small (Scarce group) or large (Plenty group) token budget and 'worked' at cognitive tasks to supplement it. Each group was aware of the others' economic situation. Although learning performance was similar for the two groups, VDAC effects were only evident in the Scarce group, who also reported lower mood after the game. These results support the view that experiencing economic scarcity may have negative impact on control over cognition perhaps by altering overriding motivational states. They also indicate that previously learned value-associations do not automatically influence attentional control but may do so when associated rewards are consistent with recently activated need states. Email: Jane Raymond, j.raymond@bham.ac.uk

Psycholinguistics 520 F, Friday Morning, 8:00-10:00 AM Chaired by Sarah Brown-Schmidt, Vanderbilt University

8:00-8:15 AM (12)

Retrieval Processes and Partners-As-Contexts in Conversation. SARAH BROWN-SCHMIDT, Vanderbilt University, SO EUN AHN, University of California, San Diego - Here we test the hypothesis that retrieval processes shape the partner-specificity of language use. In two experiments, partners in a referential communication task developed names for abstract images, and then later the speaker labeled the images either for their original partner or a new naïve partner. Inspired by some findings that context effects in memory are larger for explicit recall tasks, we hypothesized that speakers would show a larger partner-as-context effect (i.e., greater sensitivity to the knowledge of the current partner when labeling the images) when retrieval of the image involves recall (the to-be-labeled image is not physically present and must be recalled from memory), compared to when the image is present and the speaker simply describes it. Results revealed a robust audience design effect; however, this effect was not magnified in the recall task (if anything it was reduced). In sum, conversational partners encode information about their joint experiences and use this information to design utterances. However, we found no evidence that partner sensitivity was amplified in the recall task. Whether other types of retrieval processes may affect partner-specific language use remains an open question.

Email: Sarah Brown-Schmidt, sarahbrownschmidt@gmail.com

8:20-8:35 AM (13)

Age-Related Differences in Communicative Perspective-Taking in Real-Time Comprehension. RAHELEH SARYAZDI and CRAIG G. CHAMBERS, University of Toronto - One core question in studies of language processing is the extent to which interlocutors engage in communicative perspective-taking. Current evidence suggests both children and younger adult listeners are able to use a speaker's perspective to guide the early moments of processing. The present study explores the extent to which this ability is stable in the context of age-related cognitive decline. Younger and older adults followed instructions from a partner-relating to one of several visible objects (e.g., Point to the apple in the bowl). We manipulated whether a competitor (apple in basket) or a control object (doll) was occluded to the speaker. Compared to younger adults, older listeners were less likely to constrain attention to the mutually-visible target in early processing. However, a lack of age differences in the control condition suggests the observed pattern is due to agerelated declines in cognitive control or mentalizing abilities, rather than slower information-processing.

Email: Raheleh Saryazdi, raheleh.saryazdi@mail.utoronto.ca

8:40-8:55 AM (14)

Taking Turns in Time: Disassociating Cue Use in Turn-Taking Using Cross-Validation. ANTJE MEYER, Max Planck Institute for Psycholinguistics Nijmegen, LAUREL BREHM, Max Planck Institute for Psycholinguistics – In conversation, turns follow each other with minimal gaps. To achieve this, speakers must launch their utterances shortly before the predicted end of the partner's turn. End-of-turn prediction is often assumed to involve representing the partner's speech plan as if it were one's own. Therefore, coordination should be optimal when the upcoming speaker knows precisely what the partner will say. In two experiments, we tested this hypothesis. Participants were tasked with coordinating their speech onset precisely with the offset of a confederate's utterance. The object the confederate was naming was either visible to the participant or occluded from view. As predicted, occlusion hampered coordination, but the effect was small. Using machine-learning techniques we found strong evidence for a separation of timing (speech onset and offset) from content cues. This suggests that to coordinate their turns, speakers can rely on phonetic cues in the partner's speech, rather than predicting utterance content. Email: Antje S. Meyer, antje.meyer@mpi.nl

9:00-9:15 AM (15)

Prenominal Adjective Order is a Fat Big Deal Because Adjective Order is Determined by Likely Need. CHRIS F. WESTBURY, University of Alberta - When multiple adjectives precede a noun in English, they are often ordered in a way that is implicitly understood by all fluent speakers of the language. Adjective order might be described as 'a big fat deal', but to describe it as 'a fat big deal' betrays a lack of knowledge of English. Sweet (1898/1955) proposed two related semantic principles to explain the phenomenon: definiteness of denotation (adjectives that denote a property that is most independent of the modified noun must be placed closest to that noun) and closeness of adjective/noun in meaning (adjectives that denote properties essential to or inherent in the modified noun are placed closer to the noun). These observational descriptions of the phenomenon have received experimental support (Martin, 1969). However, the issue of why Sweet's rules are true has not yet been solved. I propose, operationalize, test, and find strong support for a simple hypothesis: that prenominal adjective order reflects likely need, the a priori probability that a particular adjective will be required.

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9:20-9:35 AM (16)

Prosodic Temporal Patterns as an Embodiment of Syntax: Evidence from Inner Speech. ZOHAR EVIATAR, University of Haifa, HAMUTAL KREINER, Ruppin Academic Center (Presented by Zohar Eviatar) - Neurolinguistic theories are challenged by the amodal representations assumed by linguists. Theories of embodied linguistics ground these representations by offering a model of the relationship between linguistic representation, experience, and brain. The correlation of brain activation patterns with referential features of words suggests that the mechanism underlying linguistic embodiment is an 'action-perception simulation'. This is harder to adapt to syntactic structure. We suggest that temporal patterns of brain activation that resonate to temporal patterns of speech manifested in prosody, may constitute the missing link between syntax and brain mechanisms. Prosody is highly correlated with syntactic structure and is a sensory-motor phenomenon that can evoke an action-perception simulation as inner speech. We used sEMG and keyboard typing to examine whether

motoric aspects associated with covert-speech reflect prosodic modulations related to sentence structure. The results show the feasibility of using sEMG and typing time-patterns to measure the motoric aspects associated with inner speech, and provide preliminary support for the hypothesis that prosodic properties are manifested in covert speech

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9:40-9:55 AM (17)

Memory for Novel Words in a First Language Following Sleep is Modulated by Knowledge of a Second Language. DEBRA TITONE and PAULINE PALMA, McGill University, MARIE-FRANCE MARIN, Université du Québec à Montréal, KRISTINE ONISHI, McGill University (Presented by Debra Titone) - People add new words to their mental lexicon (i.e., memory) throughout their lives. Prior work shows that the retention of novel words impacts lexical organization following sleep (e.g., Tamminen & Gaskell, 2013). It is unclear, however, whether bilingual adults exhibit the same patterns of long-term retention and lexicalization of novel words. To address this question, we trained English-L1/French-L2 bilingual adults (n = 31) on novel competitor words to English-only base words (e.g., crodle/cradle) or to French-English cognates (e.g., torato/ tomato). All stimulus materials were presented visually. On Test 1 (no-delay, prior-to-sleep), we found evidence of facilitation for cognate base words participants had been trained with novel competitors (tomato), but not with English-only base words (cradle). On Test 2 (delayed, following-sleep), we found evidence of lexical competition for cognate base words (tomato), but not for English-only words (cradle), when participants were trained with novel competitor words (torato). These data suggest bilingual adults better learn and lexicalize novel words that overlap orthographically across the L1 and L2, following a period of sleep.

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Reward, Motivation, and Decision Making 519 B, Friday Morning, 8:00-10:00 AM Chaired by Laurence Maloney, New York University

8:00-8:15 AM (18)

Probability Distortion Serves to Maximize Mutual Information Between Objective Probabilities and their Internal Representation. LAURENCE T. MALONEY, New York University, HANG ZHANG, Peking University - In decision under risk, participants act as if their choices were based on probability values systematically different from those that are objectively correct. Similar systematic distortion is found in tasks involving relative frequency judgments. These distortions are dynamic: the same participant can have different distortions in different tasks. We propose a model of probability distortion as a form of bounded rationality (Simon, 1982). The Bounded Log-Odds Model (BLO) is based on the plausible assumptions that the neural representation of probability has a fixed, limited dynamic range (Thurstone Case V) and that objective probability is dynamically remapped to its internal representation to compensate for uncertainty in probability estimates. We test the model in four experiments. BLO accounts for human performance in these experiments. We find that, subject to these BLO constraints, people maximize their information transmission or nearly so, a form of rational behavior constrained by immutable bounds. Email: Laurence T Maloney, ltm1@nyu.edu

8:20-8:35 AM (19)

Contextual Features of Delayed Options and Their Impact on Temporal Discounting. MARY KAY STEVENSON, STEVEN MORGAN, JIA QI LI, and KRISTINA GJIKA, *California State University, East Bay* – The impact of future consequences is becoming more evident in environmental decisions, foreign policy, and personal choices. There are several contextual features that have an impact on the temporal discounting processes that map onto practical problems. The current research describes the consequence structure, gains and losses evaluated as isolated events versus combined outcomes. The impact of shifting the delay range or the outcome values investigates a relative view of temporal discounting. Finally, a comparison of the impact of multiple delay ranges in an option as opposed to a single delay range is used to describe the independence of the perception of delayed gains and losses.

Email: Mary Kay Stevenson, marykay.stevenson@csueastbay. edu

8:40-8:55 AM (20)

Liking and Wanting Systems of Reward Sensitivity in Adolescents versus Adults. VALERIE F. REYNA, SARAH EDELSON, and YUVAL EREZ, Cornell University, REBECCA B. WELDON, SUNY Polytechnic Institute, LINDSEY TARPINIAN, Cornell University - Research suggests that liking and wanting of rewards (money, food) are dissociable neurally and behaviorally. Reward sensitivity is thought to characterize adolescents, those prone to addiction, and other risk-taking groups. However, reward sensitivity is often confounded with risk sensitivity, and wanting and liking are rarely distinguished, especially immediate versus long-term wanting-liking. Subjects (69 adolescents, 63 adults) rated monetary and non-monetary rewards (e.g., \$1 to \$60) for wanting now, wanting in general, liking now, and liking in general on a 21-point scale used in addiction research. Liking and wanting were similar for adolescents, and for adults when rewards were immediate. However, for adults, wanting was lower than liking for rewards in general. Wanting right now exceeded wanting in general for both groups. Thus, adults resemble adolescents in reward sensitivity when focused on the present, but differ in wanting and liking when more broadly focused. Implications for mental representations will be discussed.

Email: Valerie F. Reyna, vr53@cornell.edu

9:00-9:15 AM (21)

Why Did Pandora Open the Box? The Mechanism of Curiosity-Driven Decision-Making. JOHNNY KING L. LAU, University of Reading, HIROKI OZONO, Kagoshima University, KEI KURATOMI, Aichi Shukutoku University, ASUKA KOMIYA, Hiroshima University, KOU MURAYAMA, University of Reading – Curiosity has a strong seductive power that sometimes puts people at risk. In a series of experiments, we examined how curiosity biases decision-making, even in the face of potential physical risk. In each experimental trial, participants viewed a magic trick (or a food image). They were then shown a wheel of fortune which visualised the probability of winning/ losing and had to decide whether to gamble. If they gambled and won, they might get a ticket to see the solution. If they lost, they risked themselves receiving electric shock after the experiment. Participants could also skip the gamble. For each trick, participants rated how curious they were to know the solution. Curiosity, in addition to the increased probability of expecting no shock, encourages risk-taking. Comparing neural activations at the time of decision-making, accepting (vs rejecting) the risky gamble was associated with greater striatal activity in both magic and food trials, indicating a shared mechanism in the brain's reward network in supporting decision driven by curiosity and extrinsic rewards. Further multivariate pattern analysis demonstrated patterns of brain activities could decode decisions in the risk-taking task.

Email: Johnny King Lau, johnny.lau@reading.ac.uk

9:20-9:35 AM (22)

Interactive Effects of Motives and Situational Incentives on Motor Performance. FLORIAN MÜLLER and ROUWEN CAÑAL-BRULAND, Friedrich Schiller University Jena – Motive research posits that motivation depends on the interaction of individuals' motives with specific incentives. Motor performance research has mostly targeted the achievement motive because a standard of excellence characterizes many performance contexts. However, they also offer opportunity for cooperation and competition: affiliation and power motive incentives. We tested whether a fit between a) individuals' affiliation or power motive and b) competition and cooperation incentives affects motor performance. Participants engaged in a dart-throwing task that - following baseline measures - had them partake in either a group performance scenario (affiliation incentive) or a one-on-one competition scenario (power incentive). In contrast to previous research, the affiliation motive did not affect performance in the team condition. In line with previous findings, the power motive was positively associated with performance in the one-on-one competition scenario. Results extend findings on the power motive and highlight the need for research on affiliation.

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9:40-9:55 AM (23)

Mood Killer: Motor-Response Inhibition Reduces the Capacity of Sexually-Explicit Videos to Elicit Sexual Arousal. MARK J. FENSKE, ELIZABETH M. CLANCY, RACHEL L. DRISCOLL, SIERRA A. CODELUPPI, MAGGIE DROLET, and TUULI M. KUKKONEN, *University of Guelph* – The motivational incentive of a sexual stimulus can be a salient force in determining the focus of thought and behaviour. We previously discovered that response inhibition applied during a Go/No-go task negatively alters the motivational incentive of sex stimuli, impacting subsequent hedonic evaluations and participants' willingness to key-press for views of such items. Here we show that response inhibition also reduces the capacity of explicit videos to elicit sexual arousal, *per se.* Participants completed a Go/No-go task that required them to inhibit either sexual images or non-sexual images. Later they watched explicit videos while using a sliding-scale to selfreport ongoing changes in sexual arousal. Genital arousal was also measured. Participants who previously inhibited sexual images experienced significantly lower levels of subjective and genital arousal than those who inhibited non-sexual images. Our results suggest that motor-response inhibition alters basic representations of stimulus value that drive even the most biologically-fundamental forms of motivated behaviour. Email: Mark Fenske, mfenske@uoguelph.ca

> Eyewitness Identification 518 A, Friday Morning, 8:00-9:40 AM Chaired by Chad Dodson, University of Virginia

8:00-8:15 AM (24)

Eyewitness Identification, Confidence and Face Recognition Ability. CHAD DODSON, JESSICA GETTLEMAN, and JESSE GRABMAN, University of Virginia - Why are poorer face recognizers prone to make high confidence misidentifications and are worse calibrated than are stronger face recognizers? Nearly 1100 individuals saw 12 different faces during a study phase and then completed a series of lineup identification tests. We manipulated the study-test delay (either 5 minutes, 1 day or 1 week) and the frequency that each face was seen at encoding (either 1x or 4x) in order to produce a range of different levels of identification accuracy. We measured everyone's face recognition ability with the Cambridge Face Memory test (CFMT). Even at comparable levels of identification accuracy, poorer face recognizers are worse calibrated and are more overconfident than are stronger face recognizers. In contrast to stronger face recognizers, the calibration of confidenceaccuracy in poorer face recognizers very much depends on the overall level of performance -suggesting that it excessively depends on the quality of the memory representation. Email: Chad Dodson, cdodson@virginia.edu

8:20-8:35 AM (25)

Examining the Effects of Physiological Stress on Confidence and Accuracy in Face Recognition. DANIEL PETERSON and SARA D. DAVIS, Skidmore College, KATIE WISSMAN, North Dakota State University, WALLIS SLATER, Skidmore College - When eyewitnesses see a crime, they often do so under physiological stress. Research suggests that stress disrupts memory accuracy, but less is known about whether stress impacts the relationship between confidence and accuracy. Whereas researchers generally agree that pristine encoding and retrieval conditions lead to a strong relationship between the two (Wixted & Wells, 2017), how violations of pristine conditions affect the relationship is unclear. In two experiments, participants encoded faces either under physiological stress (via a cold pressor task), or under control conditions. Participants were later given a recognition memory test for the faces and provided confidence judgments in their old/new decisions. As expected, stress impaired face recognition accuracy. However, we observed similar confidence-accuracy relationships regardless of stress condition. Though participants in the stress

condition were less accurate in their identifications overall, they had the metacognitive awareness to scale back their confidence judgments.

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8:40-8:55 AM (26)

Forced Choice Eyewitness Memory: The Block-Marschak Inequalities. JOHN C. DUNN, University of Western Australia, CAROLYN SEMMLER, University of Adelaide, KYM MCCORMICK, University of Adelaide, DAVID KELLEN, Syracuse University - Signal Detection Theory (SDT) is increasingly used to model eyewitness memory. It is based on a fundamental assumption that memory for the perpetrator has a "random scale representation". In other words, that the memory strength of each witness can be viewed as a random draw from a distribution of some form. This assumption can be tested using an n-alternative forced choice recognition task where the probability of identifying the culprit across differently sized lineups is consistent with a set of inequalities called the Block-Marschak inequalities. We conducted an experiment in which 2,593 participants viewed a short film involving an actor. Later, they were presented with a target present lineup of between 2 and 8 items and asked to identify which item they believed to be the target. This forced choice task is equivalent to the usual lineup identification task with the exception that participants were not given the option of refusing to identify any item as the target. The probability of correct identification was found to be remarkably consistent with the Block-Marschak inequalities. We discuss the implications of this result for theories of eyewitness identification.

Email: John C. Dunn, john.dunn@uwa.edu.au

9:00-9:15 AM (27)

Estimating the Proportion of Guilty Suspects in Lineups Using Signal-Detection Models. ANDREW L. COHEN, JEFFREY J. STARNS, CAREN M. ROTELLO, and ANDREA M. CATALDO, University of Massachusetts, Amherst - The majority of eyewitness lineup studies are lab-based. How well the conclusions of these studies, including the relationship between confidence and accuracy, generalize to real-world police lineups is an open question. Signal detection theory (SDT) has emerged as a useful framework for analyzing lineups. When analyzing real-world data, a key parameter is unknown: The proportion of lineups that include a guilty suspect, p. Recent work (Wixted et al, 2015) used SDT to estimate p on a single dataset. Here we test the ability of the SDT model to recover p on a wide range of data and use simulations to determine the conditions under which the model succeeds. For both empirical and simulated studies, the model was able to recover p when conditions matched those suggested for police lineups. An R package, sdtlu, is introduced that performs SDT analysis of lineups.

Email: Andrew L. Cohen, alc@umass.edu

9:20-9:35 AM (28)

Using Diagnostic Feature-Detection Theory to Build a Better Police Lineup. MELISSA F. COLLOFF, University of Birmingham, BRENT M. WILSON, University of California, San Diego, TRAVIS M. SEALE-CARLISLE and HEATHER D. FLOWE, University of Birmingham, JOHN T. WIXTED, University of California, San Diego - A police lineup contains the suspect and a number of other members who are knownto-be innocent, called fillers. How should police officers select the fillers for a lineup? Two possible filler selection methods have previously been proposed: (1) match the fillers to the witness's description of the culprit, or (2) match the fillers to the appearance of the suspect. A lineup is considered to be fair when the suspect does not stand out and all of the lineup members match the witness's description of the culprit. The diagnostic feature-detection theory predicts that-within the constraints of fair lineup-choosing fillers that are less-similar, rather than more-similar, to the suspect should yield better eyewitness discriminability. Signal-detection based simulations and empirical data from two large-scale eyewitness studies (N > 9,800) confirmed these predictions. We propose a potentially better method for police officers selecting fillers for lineups: generate a pool of fillers that would be reasonably characterised by the witness's description of the culprit, and then select fillers that mismatch the appearance of the suspect. Email: Melissa Colloff, m.colloff@bham.ac.uk

> Perception and Action 520 C, Friday Morning, 8:00-9:40 AM Chaired by Roland Pfister, University of Würzburg

8:00-8:15 AM (29)

Something from Nothing: Agency for Deliberate Non-Actions. ROLAND PFISTER, WILFRIED KUNDE, KATHARINA A. SCHWARZ, and LISA WELLER, University of Würzburg - Several law systems punish non-actions such as failures to render assistance, although it is unknown if and how people spontaneously experience agency and responsibility for the consequences of their not acting. We will present evidence that events caused by deliberate choices not to act indeed give rise to a vivid sense of agency. This was true not only for subjective judgments also for implicit measures of temporal binding, indicating that sense of agency is not confined to overt body movements. These results replicated in two follow-up studies. At the same time, agency was more pronounced when the same event resulted from an action rather than being the consequence of a non-action, highlighting the importance of ascribing different degrees of subjective responsibility for the consequences of acting and not acting.

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8:20-8:35 AM (30)

PartnerDifferencesinTemporalSynchronization.CAROLINE PALMER, PAULINE TRANCHANT, and ELEONORE SCHOLLER, *McGill University* (Presented by Caroline Palmer) – Many rhythmic behaviors (speaking, walking) display individual differences in spontaneous movement rates. Temporal variability is lowest at spontaneous rates, and partners with equivalent rates show increased synchrony in 2-person rhythmic tasks. We address whether these effects are specific to individuals with musical training or alternatively may further constrain individuals without musical training. Individuals with and without musical training tapped a familiar melody at a spontaneous rate individually (uncued rate) and in randomly-paired duets (cued at the individual rates). Both groups showed individual differences in rhythmic tapping rates and musician pairs were more synchronous in duet tapping than nonmusicians. Both groups showed a significant negative relationship between the amount of asynchrony and the partners' difference in individual tapping rates. Notably, the relationship was stronger for nonmusicians than for musicians. These findings suggest that the same endogenous rhythmic principles constrain the performance of musically trained and untrained individuals in auditory-motor synchronization. Email: Caroline Palmer, caroline.palmer@mcgill.ca

8:40-8:55 AM (31)

Spontaneous Tempo in Music and Speech Production. PETER Q. PFORDRESHER, University at Buffalo SUNY, EMMA B. GREENSPON, Monmouth University, AMY FRIEDMAN and CAROLINE PALMER, McGill University -Recent evidence suggests that individuals are highly consistent in the spontaneous rate at which they produce music or engage in rhythmic tapping, and that these spontaneous tempos influence coordination across performers. Such tendencies suggest that musical timing is based on the adaptation of a stable internal rhythm (an endogenous oscillator). We report two experiments that addressed whether stable spontaneous rhythms guide speech production, and if so whether these rhythms are common to music and speech. Participants produced music and speech sequences at a self-selected comfortable rate. Individuals were highly consistent in their spontaneous tempo for different melodies, as well as in speech production. Correlations of spontaneous timing across music and speech production, however, were weak and did not reach statistical significance. These results suggest that music and speech may rely on endogenous oscillators that are tuned to different natural frequencies, potentially based on constraints that reflect communicative pressures.

Email: Peter Pfordreseher, pqp@buffalo.edu

9:00-9:15 AM (32)

Paul M. Fitts and James J. Gibson: Uncovering the Carmichael and Aviation Psychology Connections. ROBERT W. PROCTOR and ISIS CHONG, Purdue University - Paul M. Fitts and James J. Gibson had, and continue to have, a substantial influence on research in perception, action, and human performance. A little-known fact is that their remarkable, parallel careers were influenced by the psychologist Leonard Carmichael and the U.S. Army Air Forces Aviation Psychology program in World War II. Fitts focused on the design of equipment for use by pilots, whereas Gibson focused on motion picture testing for pilot selection. Fitts founded the applied field of engineering psychology and the basic field of human performance, both based on a human informationprocessing approach. Gibson founded ecological psychology, a school of thought that runs counter to the informationprocessing approach and emphasizes perception and action of persons interacting with natural environments. In this talk, we

review Fitts's and Gibson's careers, emphasizing similarities and differences historically and theoretically, and discuss takeaways for experimental psychologists engaging in applied research. Email: Robert W. Proctor, rproctor@purdue.edu

9:20-9:35 AM (33)

Auditory Influences on the Anticipation of Ennis Bal Trajectories. ROUWEN CAÑAL-BRULAND and FLORIAN MÜLLER, Friedrich Schiller University Jena - Accurate predictions of an opponent's shot in tennis are thought to predominantly rely on visual anticipation. In three experiments we found a systematic influence of auditory information on such predictions. In all three experiments we applied withinsubject designs and manipulated acoustic information in videos of tennis rallies. In the first experiment, we systematically manipulated the sound emanating from racket-ball-contact. Results revealed that with louder sounds participants estimated ball flight trajectories to be longer (Cañal-Bruland et al., 2018). In the second experiment, we found that with audible (versus muted) racket-ball-contact information participants judged the ball's speed to be significantly faster, indicating that sound may be used to infer power of contact. The third experiment showed systematic effects (similar to exp. 1) when the intensity of an opponent's grunt was manipulated (Müller et al., 2019). These findings are in line with multisensory integration accounts of human perception and bear significant applied implications. Email: Rouwen Cañal-Bruland, rouwen.canal.bruland@unijena.de

Symposium I: What Memory Quirks, Hiccups and Odd Phenomena Tell Us

517 D, Friday Morning, 10:00 AM -12:00 PM

Chaired by Bennett L. Schwartz, Florida International University; Zehra F. Peynircioglu, American University; Anne M. Cleary, Colorado State University

10:00-10:15 AM (34)

Role of "Revelation" in the Revelation Effect. ZEHRA F. PEYNIRCIOGLU and SARA WONG, American University -Items that need to be discovered before a recognition decision can be made are more likely to be thought to have been studied compared to those that are simply given. We show that this revelation effect is heavily influenced by the subjective feeling of revelation, akin to an "aha!" experience. In Experiment 1, test items presented as anagrams led to a revelation effect only when they were solved by the participant and not when a solution key needed to be used. In Experiment 2, no solution key was provided, and participants explicitly indicated whether or not they had experienced a feeling of insight when they solved the anagram. A revelation effect occurred only for those words that had been accompanied by an introspective sense of "revelation" and not otherwise, pointing to a crucial role of the surprise or insight that accompanies the discovery of an item in creating this illusion.

10:20-10:35 AM (35)

What the Font Size Illusion for Nonwords tells us about Metamemory. MONIKA UNDORF, University of Mannheim - People expect to remember items printed in larger fonts better than items printed in smaller fonts, although actual memorability is similar for smaller and larger items. Incidental observations raise the possibility that this font size illusion may not occur at all with nonwords. If so, this might provide insights into the basis of the font size illusion and point to limitations of current theorizing about metamemory. Three experiments obtained judgments of learning (JOLs) for words (e.g., metal), pseudowords (e.g., unsle), and nonwords (e.g., abrtz) presented in four different font sizes between 9 point and 294 point. Results revealed illusory effects of font size on JOLs for words and pseudowords in all experiments and conditions. Provided that participants attempted to master nonwords, font size also affected JOLs for nonwords. This demonstrates the robustness of the font size illusion and informs our knowledge about the basis of metamemory.

10:40-10:55 AM (36)

Why You Need Quirks to Show How It Works. STEVEN SMITH, *Texas A&M University* – A theory of human memory that cannot account for déjà vu, false memories, or tip-of-thetongue states must be considered incomplete. Memory quirks may seem odd and surprising when they occur, but they can be universal phenomena, experienced across cultures. Because quirks constitute a sort of breakdown of an otherwise functional memory system, understanding them can be especially informative in regards to the processes at work. The study of memory quirks typically begins with naturalistic observation of a phenomenon, and proceeds when experimental analogues are found that can reliably produce the phenomenon in controlled laboratory

11:00-11:15 AM (37)

Evaluating the Extent to which Memories for Déjà vu Experiences Change over Time. AKIRA O'CONNOR and COURTNEY AITKEN, University of St Andrews - Déjà vu experiences, like many memory quirks, are infrequent and short-lived, making them hard to observe in the laboratory. Retrospective questioning has yielded insight into their typical characteristics, though the bias introduced by the temporal lag between experience and evaluation remains poorly understood. In an online study, participants evaluated the characteristics of their typical déjà vu experience. They then prospectively reported and evaluated subsequent déjà vu experiences. Those who submitted prospective reports, were retrospectively questioned on these specific experiences after intervals of two and six weeks. This approach allowed us to examine how retrospective reports of particular déjà vu experiences are reconstructed over time. Our findings indicate a close correspondence between prospective and retrospective evaluations, suggesting that bias introduced by temporal lags is largely unsystematic. Drawing on these and related findings, we suggest ways of further improving the accuracy of retrospective reports of déjà vu and other memory quirks.

11:20-11:35 AM (38)

The Déjà vu Phenomenon: A Window into the Role of Familiarity in Cognitive Bias. ANNE M. CLEARY, ANDREW M. HUEBERT, and KATHERINE L. MCNEELY-WHITE, Colorado State University - Recent research showed an association between reports of déjà vu-the feeling of having experienced a situation before despite knowing otherwise-and illusory feelings of prediction. However, not all déjà vu reports are accompanied by feelings of prediction. A distinguishing feature of déjà vu reports that are accompanied by feelings of prediction is that these trials tend to have higher levels of reported perceived familiarity intensity. This pattern suggests that familiarity intensity may be a driver of illusions of prediction. Indeed, several experiments from our lab suggest that as the familiarity level of a dynamic test stimulus is experimentally increased, illusory feelings of predication are also increased. This pattern of increased illusory prediction occurred when the spatial configuration within a virtual tour had been repeatedly familiarized earlier in the experiment. It was also shown when the rhythm or pitch sequence within a piece of music had been repeatedly familiarized.

11:40-11:55 AM (39)

Divided Attention Can Enhance Memory: When Distraction Improves Memory Encoding. NEIL MULLIGAN, University of North Carolina at Chapel Hill - Distraction during encoding has long been known to impair later memory performance, results critical to cornerstone theories from the earliest days of the "cognitive revolution" as well as to current theories of memory and attention. However, recent findings have uncovered conditions under which distraction not only fails to harm memory encoding but actually enhances it relative to full attention encoding. This talk will review recent research on the attentional boost effect which demonstrates how a distractor task can, under certain conditions, enhance later performance on implicit tests of memory and on recognition memory. Analogous results have been found in research on taskirrelevant-perceptual-learning (TIPL), implicit recognition, perceptual categorization, and retrieval-induced-forgetting. These experiments extend the results to visual working memory, some forms of visual long-term memory, and recall with verbal materials. Neuroimaging, neuropsychological, and TMS studies provide hints about the neural underpinnings of these phenomena.

Letter/Word Processing: Individual and Cultural Differences 520 B, Friday Morning, 10:20 AM -12:00 PM

Chaired by Ariel M. Cohen-Goldberg, Tufts University

10:20-10:35 AM (40)

Signlikeness Judgments in American Sign Language. ARIEL M. COHEN-GOLDBERG, *Tufts University*, ZED S. SEVCIKOVA SEHYR and KAREN EMMOREY, *San Diego State University*, NAOMI CASELLI, *Boston University* – The wordlikeness task, in which participants judge how good non-words are as possible words of their language, provides a window onto speakers' knowledge of the phonological patterns of their language. We report the results of a study examining 'signlikeness' judgments of ASL non-signs made by deaf ASL signers and by hearing non-signers. Deaf ratings were influenced by the non-sign's phonological form and neighborhood density and predicted accuracy and reaction time in a lexical decision task. Hearing participants' ratings correlated with the deaf ratings (r = .28), even though they did not know ASL. These results indicate that signers use both sub-lexical and lexical information when making signlikeness judgments and suggest that non-signers may be sensitive to important nonlinguistic manual/visual biases. These results demonstrate this methodology is a viable means to investigate the nature and origins of phonological knowledge in signed languages and informs arguments about linguistic wellformedness in general. Email: Ariel M. Cohen-Goldberg, ariel.goldberg@tufts.edu

10:40-10:55 AM (41)

The Nature of Spelling Errors in Deaf and Hearing Adults. ZED S. SEVCIKOVA SEHYR, ANDREA MANRIQUEZ, and KAREN EMMOREY, San Diego State University - We examined the nature of English spelling errors to determine the extent to which orthographic representations are influenced by phonology in deaf and hearing adults with varying levels of reading ability. Seventy-eight deaf and 129 hearing adults spelled 30 target words using a cloze procedure and completed spelling recognition, reading comprehension, and phonology tests. Hearing participants outperformed deaf participants on spelling production accuracy (84 vs. 77%), reading (89 vs. 83%), and phonology (91 vs. 64%) but the groups did not differ on spelling recognition. Spelling production accuracy was positively correlated with spelling recognition, reading, and phonological ability in both groups. Better readers produced fewer spelling errors - but only in the deaf group, pointing to a greater importance of orthographic encoding to reading comprehension. Hearing participants made more substitution, deletion and insertion errors while the deaf group made more letter shifts and transposition errors and made more phonetically illegal errors than the hearing group. The pattern of results supports the notion that deaf readers have a more coarse-grained orthographic code that may be optimized for fast access to semantics.

Email: Zed Sevcikova Sehyr, zsevcikova@sdsu.edu

11:00-11:15 AM (42)

The Role of Lexical Access in Peripheral Perception: Evidence from Sign Superiority Effects in Deaf Signers. ELIZABETH R. SCHOTTER and EMILY JOHNSON, *University of South Florida*, AMY LIEBERMAN, *Boston University* – Deaf signers' larger attentional span allows them to read more efficiently (Bélanger et al., 2012). Does their experience processing sign language, which involves dynamic processing across the visual field, contribute to this enhancement? We tested whether deaf signers recruit language knowledge to facilitate peripheral processing through a *sign superiority effect* (i.e., better handshape perception in sign than a pseudo-sign; cf. *word superiority effect*, Wheeler, 1970) and *fingerspelled word superiority effect* (i.e., better letter perception in a fingerspelled word than a nonword). Accuracy on both tasks was higher for deaf signers than hearing non-signing controls, higher in the near than the far periphery, and there was a three-way interaction whereby deaf signers showed lexical superiority effects only at the far eccentricity and controls showed no interaction. Thus, deaf signers recruit lexical knowledge to facilitate peripheral perceptual processing, which may allow them to visually process text efficiently when reading English.

Email: Elizabeth R. Schotter, eschotter@usf.edu

11:20-11:35 AM (43)

Semantic Substitution Errors in Chinese Reading Aloud: From Reading Passages to Single Word Naming. CATHERINE L. CALDWELL-HARRIS, JIAJUN ZHU, NING JIA, and JILLIAN HUIBONHOA, Boston University - Surprisingly, Chinese readers make semantic substitution errors while reading out loud. In a prior study, 90% of Chinese native speakers made errors, such as pronouncing d說 "say" instead of 問 "ask." A passage reading task was designed to include two-character words which had a synonym; the synonym had more or less phonetic information. Readers did not frequently make errors on the synonym pairs we had inserted, indicating that creating errors is idiosyncratic and cannot easily be manufactured. Error analysis confirmed our hypothesis that lower frequency words were replaced by higher frequency words. Words belonging to the synonym pairs were then used for lateralized single word naming. Semantic errors were 33% of all naming errors. Semantic priming, amount of phonetic information, and visual field did not influence errors. Consistent with the passage reading task, lower frequency words were the stimuli which were most likely to elicit a semantic substitution.

Email: Catherine L. Caldwell-Harris, charris@bu.edu

11:40-11:55 AM (44)

On the Segmentation of Incremental Words During Chinese

Reading. XINGSHAN LI, Chinese Academy of Sciences - In Chinese, there are some incremental words, in which multicharacter words contain a subset of characters that constitute another word (referred to as the embedded word. In the current talk, we will introduce some recent progress on experimental and modelling studies on how Chinese readers segment words during natural sentence reading. In one of these studies, Chinese readers read sentences with some incremental words while their eye movements were monitored. We manipulated the plausibility of incremental words and their embedded words. Results showed an interaction between the plausibility of the whole words and the plausibility of the embedded words on the reading times on the target word region. When the whole incremental word was plausible, the plausibility of the embedded words did not affect reading time on the target region. However, when the whole incremental word was implausible, reading times on the implausible embedded word was longer than plausible embedded word. These results suggest that Chinese readers tend to segment incremental word as a whole, but they can adjust their segmentation strategy very quickly once they found the segmentation is incongruent with sentence context.

Email: Xingshan Li, lixs@psych.ac.cn

Associative Learning 520 F, Friday Morning, 10:20-11:40 AM Chaired by Marc N. Coutanche, University of Pittsburgh

10:20-10:35 AM (45)

A Role for Schema in Establishing Relational Memory Associations in the Human Brain. MARC N. COUTANCHE and JOHN P. PAULUS, University of Pittsburgh – The integration of new information into memory is influenced by the existence of related prior knowledge. Newly encountered information can be more rapidly consolidated into neocortical regions when a schema is present, compared to when a schema is absent. How does schema influence the formation of links between related pieces of knowledge? We investigated this question by identifying multivariate patterns of activity in functional magnetic resonance imaging (fMRI) scans as participants retrieved explicitly taught, and indirectly associated, pieces of knowledge that were consistent or inconsistent with a schema. Participants first learned word pairs (occupation and location) from sets of four words that fall into the same (teacher-classroom) or different (nurse-bar) schema. During an fMRI scan, participants retrieved explicitly taught (A-B, B-C, C-D) and untaught (A-C, A-D) associations. We used machine learning classifiers to identify brain regions for which schemaconsistency and relationships (direct/relational) influence activity. Information about schema-consistency and/or the type of associations was found in activity patterns of a network of the angular gyrus, medial prefrontal cortex, visual word form area, and hippocampus.

Email: Marc N. Coutanche, marc.coutanche@pitt.edu

10:40-10:55 AM (46)

Incidental Visual Statistical Learning is Influenced by Other Forms of Learning. TIMOTHY J. VICKERY, LEELAND L. ROGERS, and SU HYOUN PARK, University of Delaware -Associations among stimuli that consistently co-occur in space or time are incidentally learned by humans (visual statistical learning, VSL). Real-world VSL occurs in the context of other known environmental structure. We previously found that natural categories strongly shape VSL, with same-category pairs learned at greater rates than different-category pairs, but whether this effect was driven by similarity or category boundaries was unclear. In two experiments, we presented subjects with a stream of images (fractals or faces/scenes) composed of AB pairs of stimuli, where A always predicted B. Subjects' task during this familiarization phase was to learn arbitrary group mappings. Half the pairs were same-group (associated with same response) while the other were different-group (different responses). During pair recognition, subjects showed much better learning of within- than between-group pairings. Orthogonal natural-category manipulations still played a role, but one that did not interact with arbitrary groupings. Our results suggest that learned structure of the world (e.g., category membership) strongly shapes the incidental acquisition of statistical knowledge.

Email: Timothy J. Vickery, tvickery@psych.udel.edu

Paper 43 - 46

11:00-11:15 AM (47)

Contingency Learning with A, B, C, and D Cell Events: Contrasting Number of Trials with Duration of Trials. RALPH R. MILLER, AUDREY LI, ANNA TSVETKOV, and DORIANN M. ALCAIDE, SUNY at Binghamton, JAMES E. WITNAUER, SUNY at Brockport, SANTIAGO CASTIELLO DE OBESO, and DYEDRA MORRISSEY, University of Oxford, CODY W. POLACK, SUNY at Binghamton, ROBIN A. MURPHY, University of Oxford - In a contingency learning situation, using a rapid-trial streaming procedure containing X-Y pairings (A trials), X-alone (B trials), Y-alone (C trials), and neither X nor Y (D trials), we independently varied, by the same fraction, the number and duration of each type of trial. Consistent with prior research, contingency ratings increased strongly with number of A trials, decreased moderately with number of B and C trials, and increased weakly with number of D trials. Across multiple experiments, a weak but significant effect of trial duration was also detected, which was always in the same direction as number of trials. For each type of trial, number of trials had a much larger effect size than did duration of trials. Thus, increasing the number of A, B, or C trials affected contingency ratings, even when A, B, and C trial durations, respectively, were proportionately reduced.

Email: Ralph R Miller, rmiller@binghamton.edu

11:20-11:35 AM (48)

Inferred Causal Structure Predicts Transfer of Inhibitory Learning in a Feature Negative Design. JESSICA C. LEE and PETER F. LOVIBOND, University of New South Wales -According to influential associative learning models, feature negative training (intermixed A+ and AB- trials) should result in the feature (B) acquiring negative associative strength and becoming a conditioned inhibitor (i.e., preventative learning). However, animal studies show that under some conditions, the feature becomes a negative occasion setter, modulating the causal effect of the target A (i.e., modulatory learning). Other studies show that subsequent counterconditioning of B fails to generalize back to the AB compound, suggesting a configural learning strategy. In 2 experiments, we tested whether evidence for these 3 types of learning (prevention/modulation/ configural) could be observed in humans. We found effects of inferred causal structure (Experiments 1 and 2) as well as manipulated causal structure (Experiment 2) on the degree of transfer of inhibition to a novel target. Our results suggest that a variety of causal structures can be inferred in a feature negative design, each with different functional properties. Email: Jessica Lee, jessica.lee@unsw.edu.au

Visual Working Memory 520 C, Friday Morning, 10:00 AM -12:00 PM Chaired by Stefanie Becker, The University of Queensland

10:00-10:15 AM (49)

Storage of Relative Features Enhances Visual Short-Term Memory (VSTM). STEFANIE I. BECKER, AIMEE MARTIN, and ZACHARY HAMBLIN-FROHMAN, *The University of Queensland* – Visual short-term memory (VSTM) allows us to store and recall visually presented information. Current



theories postulate that different stimuli (e.g., colours) are all encoded independently. However, studies on the relational account of attention have shown that stimuli are often encoded in a relational, context-dependent manner in VSTM. Standard change detection tasks showed that we are more sensitive to changes when the relative colour changes between memory and test display (e.g., from reddest to non-reddest) than when it remains the same (e.g., reddest item changes to orange but remains the reddest), reflecting encoding of relative colours into VSTM. The current study tested whether storing relative features can confer further advantages when stimuli are presented in a certain order. We found that the CDA in the EEG (a marker of VSTM load) was smaller when the to-bememorised colours were arrayed to match a specific order (e.g., bluest to greenest) than when they were randomly ordered. Moreover, the sensitivity for detecting changes was higher among ordered colours. With this, the current results provide the first electrophysiological evidence that feature relationships are encoded into VSTM, and aid VSTM performance. Email: Stefanie I. Becker, s.becker@psy.uq.edu.au

10:20-10:35 AM (50)

Improving Visual Working Memory with Verbal Labeling. ALESSANDRAS. SOUZA and CLARA OVERKOTT, University of Zurich, MARTA MATYJA, University of Warsaw, JUHEE JANG, University of Zurich - As the load on visual working memory increases, storage of visual details becomes poorer. Souza and Skóra (2017) showed that these capacity limitations can be alleviated by verbal labeling: compared to articulatory suppression, color labeling increased the retention of continuous and categorical information about the colors in a reproduction task. Here, we further investigate whether the labeling benefit is constrained by the specificity of the labels used and by which point in time labeling occurred. In Experiment 1, participants were allowed to use 0, 2, 4, or any term they wanted for labeling the memoranda. The labeling benefit was proportional to the number of labels used, and this benefit was larger for the storage of continuous than categorical information. In Experiments 2 and 3, we tested whether this labeling benefit is due to better encoding, maintenance, or retrieval of the colors by varying when labeling occurred (at encoding or different points during the retention interval). Labeling yielded better performance than suppression irrespective of when it occurred. In sum, these results indicate that precise labels keep visual representations sharp by protecting them from visual interference at test. Email: Alessandra S. Souza, a.souza@psychologie.uzh.ch

10:40-10:55 AM (51)

Exploring How Visual Masking Disrupts Working Memory Recall. TIMOTHY J. RICKER, *City University of New York* – Post-perceptual masking reliably impairs memory performance. Masking is the act of presenting a non-target stimulus at the same perceptual location as a target stimulus to disrupt perceptual processing. Although masking is a common procedure, the exact reason that memory performance suffers after post-perceptual masking is unclear. This experiment explores whether masking impairs performance by, (1) probabilistically abolishing the perceptual trace, resulting in no memory on some trials, or (2) adds noise to the memory representation or creation process, resulting in either a less precise memory or only gist memory about the target. The results indicate large changes to the probability an item is encoded into working memory and small but consistent changes in memory precision as a result of masking. This demonstrated that masking abolishes early perceptual representations completely, when it has any effect at all. Only a small fraction of the masking effect result from impoverished representations.

Email: Timothy J. Ricker, Timothy.Ricker@csi.cuny.edu

11:00-11:15 AM (52)

Shared Constraints on the Precision of Visual Working and Visual Long-Term Memory. TIMOTHY F. BRADY S. , ANNALISE E. MINER, and JOHN T. WIXTED, University of California, San Diego, MARK W. SCHURGIN, University of California, San Diego - Is working memory more 'precise' than long-term memory -- i.e., can people discriminate an item from a very similar item more accurately in working memory than long-term memory? Here, we examine this using a new understanding of how memory strength relates to precision of discrimination (TCC; Schurgin, Wixted & Brady, 2018). We measured continuous color report performance across a range of set sizes in working memory as well as a wide range of long-term memory strengths (manipulated via repetition). We find that the two memory systems are identical in their ability to discriminate subtle variations. In both systems, the ability to discriminate similar items is solely driven by the similarity structure of the stimulus space and memory strength, in line with the predictions of TCC. This suggests that the documented differences between these two systems may not be due to a fundamental distinction between their representation, but rather an artifact of comparing working memory to comparatively weak long-term memories.

Email: Timothy Brady, timbrady@ucsd.edu

11:20-11:35 AM (53)

An Interference Model for Visual Working Memory: Application to Change Detection. KLAUS OBERAUER Q and HSUAN-YU LIN, University of Zurich - Why is the capacity of visual working memory (VWM) limited? Most models build on the assumption of a limited resource, in the form of discrete slots or a continuously divisible quantity. We have proposed the Interference Model (IM) as an alternative that applies the principles of cue-based retrieval and interference to VWM. The IM so far explains error distributions from the continuous-reproduction paradigm. Here we extend the IM to another popular VWM paradigm, change detection. We fitted the IM as well as two competing models -- Variable Precision and Slot-Averaging -- to the data from two change-detection experiments. The models were equipped with an optimal Bayesian decision rule based on Keshvari, van den Berg, & Ma (2013). The IM provided a far better fit than the other two models, mainly because the IM uniquely predicts the intrusion cost observed in the data: False "same" responses were given more often when the target object was changed to a non-target than when it was changed to a new object. When the two competing models were augmented by mechanisms for swap errors, their performance improved, but the IM still fit better. Email: Klaus Oberauer, k.oberauer@psychologie.uzh.ch

11:40-11:55 AM (54)

A Single Factor Accounts for Variability in Iconic and Visual Working Memory. MICHAEL S. PRATTE, Mississippi State University - Working memory capacity varies substantially across people and varies across particular stimuli even in simple tests of visual working memory (VWM). We characterized these sources of variability in change-detection performance for arrays of colored squares, manipulating the time between study and an item cue in order to measure visual sensory (iconic) memory and VWM. As expected, people varied in their VWM capacity, and particular stimulus displays varied systematically in their VWM difficulty. However, this variability in VWM, across people and across stimuli, could be accounted for by highly similar variability in iconic memory: If a person had a relatively high iconic memory capacity, then they had a high VWM capacity; if iconic memory performance was poor for a particular stimulus display, VWM performance was similarly poor. Only a single factor was needed to account for variability in both iconic and VWM across a range of study-cue delays, suggesting that a core process, such as attention, determines both iconic and visual working memory performance limitations. These findings add critical constraints on why person and stimulus variability exist in visual working memory. Email: Mike Pratte, prattems@gmail.com

Bilingual Production 519 B, Friday Morning, 10:20 AM -12:00 PM Chaired by Wendy Francis, University of Texas at El Paso

10:20-10:35 AM (55)

Short-Term and Long-Term Effects of Contextualized Comprehension Exposures on Bilingual Word Production. WENDY S. FRANCIS and ANDREA TOVAR, University of Texas at El Paso - Our previous research showed that comprehension of contextualized words facilitates their production several minutes later (Francis, Gurrola, Martinez, Negron, & Medellin, 2018) and that comprehension of isolated words facilitates their production the next day (Francis & Guedea, 2018). We tested whether words comprehended in sentence contexts would exhibit facilitation in spoken production across days. Spanish-English bilingual participants (N = 56) were tested in two sessions 24 to 48 hours apart. At encoding, participants performed tasks with words and sentences meant to practice comprehension or production in the language of a final picture-naming task. Encoding tasks were performed in both sessions, and picture naming only in the second session. Repetition priming was measured in final picture naming RTs and accuracy by comparing performance for repeated and new items. The effects of context, retention interval, processes practiced, language proficiency, and word frequency on repetition priming were examined. Supported by NSF Grant BCS-1632283.

Email: Wendy S. Francis, wfrancis@utep.edu

10:40-10:55 AM (56)

Information Density and Speaking Rate in Second-Language Speech. ANN R. BRADLOW, *Northwestern University* – Crosslanguage comparisons (e.g. Pellegrino, Coupé, Marsico, 2011, Language, 87:3) suggest an inverse relationship between speaking rate (syllables/second) and information density (number of speech units for a given meaning) such that information conveyed per second (information rate) remains relatively constant. Extending this information processing analysis to L2 speech, this study compared speaking rate and information density in sentence- and paragraph-length utterances by L2 English speakers (n=87 from 10 different L1 backgrounds) and by L1 English speakers (n=25). L2 English involved both slower rates (fewer syllables/sec) and lower information density (more syllables per given text) than L1 English. A follow-up comparison of the number of acoustic syllables (amplitude peaks in the signal) versus orthographic syllables (dictionary-based counts) indicated substantial syllable reduction for L1 speech (acoustic<orthographic) but substantial syllable epenthesis (acoustic>orthographic) for L2 speech. Thus, compared to L1 speech, L2 speech involved information-sparse syllables at slow rates yielding an information transmission profile that may fall outside the optimal range for human information processing of dynamic signals.

Email: Ann R. Bradlow, abradlow@northwestern.edu

11:00-11:15 AM (57)

Language Dominance and Entropy as Predictors of Word Segmentation Cue Production in Bilinguals. ANNIE C. GILBERT, JASON W. GULLIFER, MAX WOLPERT, and HARUKA SAITO, McGill University, SHANNA KOUSAIE, Montreal Neurological Institute, INBAL ITZHAK, McGill University, VINCENT L. GRACCO, Haskins Laboratories, DENISE KLEIN, Montreal Neurological Institute, NATALIE A. PHILLIPS, Concordia University, DEBRA TITONE and SHARI R. BAUM, McGill University - Adapting one's prosody to a second or non-dominant language can be difficult, and failure to do so may render speech hard to understand. In the present study, we investigate the production of fundamental frequency (F0) modulations and syllabic lengthening as word-level and sentence-level prosodic cues by sixty French-English bilinguals (FEs; L1 French and L1 English) with diverse language experience. Each participant produced English and French utterances, providing both L2 and L1 productions (used as reference). Linear mixed effects models (LMEs) revealed that FEs' ability to produce L1 and L2 specific cues depends on individual differences in both objective language proficiency (measured by verbal fluency performance) and diversity of language exposure (measured by language entropy). FEs also produced different prosodic patterns in English and French, suggesting that the production of word-level and sentencelevel prosodic cues is both adaptive (modified by language experience) and selective (specific to each language).

Email: Annie C. Gilbert, annie.c.gilbert@mail.mcgill.ca

11:20-11:35 AM (58)

Timing of Application of Bilingual Inhibitory Control. IVA M. IVANOVA, *University of Texas at El Paso* – Bilinguals inhibit the non-response language to avoid wrong-language intrusions (Green, 1998), but theories of inhibitory control do not specify when inhibition is applied. It could be applied once, immediately after a language switch (Zheng et al., 2019) or cumulatively over time (Kleinman & Gollan, 2018). Here, Spanish-English bilinguals dominant in English named pictures in three phases: dominant naming (Phase 1), non-dominant naming (Phase 2), and again dominant naming (Phase 3). The critical manipulation was length of non-dominant naming in Phase 2. Participants were divided into three groups depending on this phase's length: long (9 repetitions of 32 pictures), medium (6 repetitions) or short (3 repetitions). To test both global and local inhibition, Phase 3 contained item sets that were previously named in both Phases 1 and 2, only Phase 2, or were new. Reaction-time differences between dominant naming in Phase 1 and Phase 3 were analyzed to account for betweengroup differences in naming speed. Overall and within each item set, these differences were unaffected by the length of nondominant naming in Phase 2. These results are more consistent with once-only than with cumulative application of inhibition. Email: Iva M. Ivanova, imivanova@utep.edu

11:40-11:55 AM (59)

The Role of Emotion on Unintentional Language Slips in Multilingual Speakers. SHELIA M. KENNISON and VICTORIA H. SPOONER, Oklahoma State University - The speech of multilingual speakers, as that of monolinguals, may occasionally include errors in which utterances are produced differently than intended (also called slips of the tongue). Multilingual speakers sometimes produce language slips, in which they unintentionally switch from speaking in one language to speaking in another. Few studies have examined this type of error. The present research investigated the role of emotion (positive vs. negative) in the occurrence of unintentional language slips. In a survey, 140 multilingual participants were asked about their past language slips. If they had experienced any, they were asked to describe one of the events and to rate their mood during that event. Positive and negative mood were assessed using the 60-item PANAS-X (Watson & Clark, 1999). Sixty-seven respondents (40 women, 27 men) reported at least one prior unintentional language slip. For these respondents, we calculated the difference between average positive and negative mood at the time of the language slip. The results showed that average mood during language slips was significantly more positive than negative. Implications for models of speech production and codeswitching in multilingual speakers will be discussed.

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Cognitive Control I

520 A, Friday Morning, 10:00 AM - 12:00 PM *Chaired by Iring Koch, RWTH Aachen University, Aachen*

10:00-10:15 AM (60)

Feature Binding and Response Inhibition in Task Switching: Examining the Influence of Characteristics of Cues, Stimuli, and Responses on Response-Repetition Effects. IRING KOCH, ANDREA M. PHILIPP, and STEFANIE SCHUCH, *RWTH Aachen University* – Task switching involves flexible, context-sensitive adjustment of cognitive processing. This flexibility requires cognitive control, which can be explored by assessing the pattern of beneficial and detrimental aftereffects of preceding trials. Here we focus on response repetition effects, which are beneficial in task repetitions but often invoke performance costs in task switches. We review findings of recent studies that examined a variety of factors affecting this interaction pattern, such as variations in cue and stimulus modality as well as spatial response separation and temporal response-stimulus interval. Overall, the data are consistent with flexible feature binding processes that modulate repetition benefits at task and response level, but we also found evidence for inhibition of executed responses. Together, the existing findings suggest a hybrid account of response repetition effects in task switching involving episodic binding as well as response inhibition.

Email: Iring Koch, koch@psych.rwth-aachen.de

10:20-10:35 AM (61)

Spatial Attention Enhances the Selectivity of Global Population Codes During Early Visual Processing. EDWARD AWH and JOSHUA J. FOSTER, University of Chicago - EEG studies have shown that spatial attention causes larger stimulus-evoked neural responses during early stages of visual processing, providing strong evidence for early selection models. Such findings do not establish, however, whether these early attentional modulations yield improvements in the discriminability or selectivity of the global population codes that form the basis of perception. We addressed this question by using EEG activity to track global spatial population codes evoked by attended and unattended stimuli. Focusing on the scalp topography of broadband power, we used an inverted encoding analysis to measure the profile of activity across a set of spatial channels that covered all possible target positions. This revealed a graded tuning function that peaked at the target location. Critically, the amplitude of this channel tuning function was markedly enhanced for attended stimuli starting 80 ms after target onset, demonstrating that spatial attention enhances the selectivity of stimulus-evoked population codes. Email: Edward Awh, awh@uchicago.edu

10:40-10:55 AM (62)

Let Your Fingers Do the Walking: Finger Force Distinguishes Competing Accounts of the Congruency Sequence Effect. DANIEL H. WEISSMAN, University of Michigan, Ann Arbor - In distractor-interference tasks, participants respond more slowly when a distractor cues a different response than a target (incongruent trials) than when it cues the same response (congruent trials). However, this congruency effect is smaller after incongruent trials than after congruent trials. Interestingly, recent data from the prime-probe task indicate that this congruency sequence effect (CSE) is largest when participants treat the distractor, or prime, as the first of two temporally separated targets. It remains unclear, however, whether the CSE in this task indexes (a) control processes that modulate response activation before the second target (i.e., probe) appears or (b) congruency switch costs that delay responses after the probe appears. To distinguish between these accounts, I recorded participants' responses with force-sensitive keys. After responding to the prime, but before the probe appeared, participants exerted greater force on (a) the key cued by the prime after congruent trials, but on (b) the opposite key after

incongruent trials. These findings indicate that the CSE reflects control processes that modulate response activation prior to the appearance of a goal-relevant stimulus.

Email: Daniel Weissman, danweiss@umich.edu

11:00-11:15 AM (63)

Sleep Deprivation Effects on a Novel Form of Cognitive Flexibility. PAUL WHITNEY, JOHN M. HINSON, HANS P.A. VAN DONGEN, KIMBERLY A. HONN, and AMY T. NUSBAUM, Washington State University - The effects of sleep deprivation (SD) are highly variable across cognitive tasks but are particularly large for tasks requiring cognitive flexibility (CF). However, the literature on CF focuses primarily on tasks that involve overcoming a newly acquired response pattern, while CF in everyday life often involves overcoming a previously established response bias. Accordingly, we developed the Framed Gambling Task (FGT), which requires using choice outcome feedback to overcome a pre-existing framing bias, i.e., risk seeking to avoid sure losses and risk avoidance to retain sure gains. In two controlled laboratory SD experiments, rested and sleep deprived participants performed the FGT with or without time pressure on making choices. Without time pressure, performance of SD and rested participants was equivalent, but the combination of SD and time pressure produced impairments in overcoming framing bias. The data are consistent with a dynamic attentional control view of CF. Email: Paul Whitney, pwhitney@wsu.edu

11:20-11:35 AM (64)

Individual Differences in Attention, and in Self-Reported Attention. DAVID WASHBURN, J. ANTONIO SALAMANCA, ALESHA D. BOND, JENNIFER JOHNSON, MELANY LOVE, and WILL WHITHAM, Georgia State University - People differ in the capacity to focus, scan, and sustain attention-skills that are commonly measured with a variety of psychometric tasks, but that may also be subject to self-reflection. That is, individuals can, and often do, describe themselves as being good or poor at paying attention. We tested 600 undergraduate volunteers on a battery of computerized tasks (e.g., Stroop, Visual Search, Cuing, N-back, Card Sorting, processing speed) that have been used to study attention, executive functioning, and related constructs. We also asked participants to rate their own capacities for selection, vigilance, search, and executive control. Performance-based measures generally correlated poorly with self-report indices, replicating previous findings. However, extreme-groups analyses based on tertile splits of the self-reported attention skills did reveal significant group differences in performance-based measures of attention control, sustained attention, and processing speed. Thus, beliefs about cognitive abilities tend not to predict well individual differences in performance on tests those abilities, but self-reports do seem to be related to executive control and, perhaps, measures of fluid intelligence.

Email: David A. Washburn, dwashburn@gsu.edu

11:40-11:55 AM (65)

Why Most Studies of Individual Differences with Inhibition Tasks are Bound to Fail. JEFFREY N. ROUDER and AAKRITI KUMAR, University of California, Irvine, JULIA M. HAAF, University of Amsterdam - Establishing correlations among common inhibition tasks such as Stroop and flanker has been proven difficult despite many attempts. It remains unknown whether this difficulty occurs because inhibition is a disparate set of phenomena or whether the analytical techniques to uncover a unified inhibition phenomenon fail in real-world contexts. To answer this question, we first show that ordinary methods of correlating performance including those with latent variable models are doomed to fail because of trial noise. We then develop hierarchical models that account for variation across trials, variation across individuals, and covariation across individuals and tasks. Yet, these hierarchical models also fail to uncover correlations in typical designs. While they can characterize the degree of trial noise, they cannot recover latent correlations in typical designs (even for those that enroll hundreds of people). The upshot is that to correlate individual differences in tasks, researchers may need thousands of trials per individual. Sorry :(

Email: Jeffrey N. Rouder, jrouder@uci.edu

Lunchtime Workshop: Supporting Undergraduates at Psychonomics (UP) Room 519 A, Friday, 12:00-1:30 PM

Lunchtime Workshop: Hacking Your Mind – A New 4 Hour PBS Series on Behavioral Psychology

Room 524 A-B, Friday, 12:00-1:30 PM

Symposium II: Re-organizing Our Understanding of Semantic and Episodic Memory 517 D, Friday Afternoon, 1:30-3:30 PM Chaired by Louis Renoult, University of East Anglia; Signy Sheldon, McGill University

1:30-1:45 PM (66)

Symposium Introduction: The distinction between semantic and episodic memory. LOUIS RENOULT, University of East Anglia – The distinction between semantic and episodic memory was proposed by Endel Tulving in 1972. Crucially, in this initial chapter and in subsequent writings, it is specified that the two systems interact and are "partially overlapping". In this introduction to the symposium, I will briefly review how the semantic-episodic dichotomy has evolved over the years in Tulving's writings, as well more recent research on the cognitive and neural correlates of semantic and episodic memory. Episodic and semantic retrieval seemingly involve engagement of a common core cortical network and, consistent with Tulving's original ideas, are clearly interacting and overlapping during normal declarative memory functions.

1:50-2:05 PM (67)

An integrated view of episodic and semantic memory processing during complex retrieval tasks. SIGNY SHELDON, McGill University - Although retrieving complex memories, whether of personal experiences or general concepts, often relies on the interactivity between episodic and semantic memory systems, laboratory research tends to study these systems as independent. In this talk, I will present experimental evidence that show the situations under which episodic and semantic memory processes interact and influence one another. First, I will present neuropsychological and neuroimaging data that indicate that traditional semantic memory tasks, like category fluency and problem solving, relies upon hippocampally-mediated episodic memory processes. Next, I will report the findings from a behavioral experiment conducted in aging populations that highlights how accessing different types of semantic memory alters the retrieval of episodic autobiographical memories. Together, these results argue against a distinction between episodic and semantic memory and argues for viewing the memory as a set of interactive component processes.

2:10-2:25 PM (68)

Representation of Complex Events and the Interplay Between Episodic and Semantic Memory. CHARAN RANGANATH, University of California, Davis - In the lab, episodic memory is studied by assessing recognition or recall of briefly presented items, but real-world events have temporal and semantic structure that is not captured by these paradigms. I will describe a new program of research aimed at understanding how we form memories for events, and how these memories may be transformed over time. Our research suggests that there may be a hierarchical organization of episodic memory, such that the hippocampus encodes episode-unique sequences of experiences within an event, whereas posterior medial cortical areas encode event schemas that generalize across similar events, and the ventromedial prefrontal cortex may encode schematic information that characterizes situations in which particular kinds of events may occur. Moreover, episodic memory representations may be reorganized through sleepdependent memory consolidation, such that related events that occurred at different times can become linked. These findings support a neuro-computational framework that conceptualizes the episodic-semantic in terms of cortico-hippocampal interactions.

2:30-2:45 PM (69)

The Cognitive and Neural Bases of Personal Semantic Memory: Insights from Individuals with Lesions to the Core Autobiographical Memory Neural Network. MATTHEW D. GRILLI, University of Arizona – Much of one's autobiographical memory is composed of personal semantic memory, which is knowledge about the self and one's life story. The degree to which personal semantic memory relies on cognitive and neural mechanisms that overlap with episodic memory or general semantics remains unclear, although this has implications for memory theory and clinical psychology. In this talk, I will draw on neuropsychological findings from my laboratory to suggest that personal semantics share features with both episodic memory and general semantics. Specifically, I will present data indicating that individuals with lesions to the extended episodic memory system tend to retrieve personal knowledge that is stripped of spatiotemporal references. I will also present evidence showing that similar to general semantics, personal semantic memory is organized according to the specificity of knowledge to a unique entity, with this common principle supported in part, but perhaps not exclusively, by the lateral temporal lobes.

2:50-3:05 PM (70)

Constructing and deconstructing the dynamics of autobiographical thought. JESSICA ANDREWS-HANNA, University of Arizona - Laboratory-based paradigms have made substantial headway towards delineating the component processes and neural underpinnings of episodic and semantic memory. As such, we know a great deal about the static nature of such processes, which hint at their associative properties and predictive functions, and raise key questions about their independence. In contrast, relatively little is known about the dynamics of autobiographical thought - that is, how memories and prospective thoughts arise and unfold over time, both in the lab and in daily life. In this talk, I will introduce a neurocognitive framework with which to understand the stability and flexibility of our mental lives, as well as novel paradigms and preliminary findings pertaining to the dynamics of autobiographical thought. The picture that emerges is one with important functional and clinical significance, in which semantic and episodic processes are inherently intertwined each influencing the other.

Vision

520 A, Friday Afternoon, 1:30-3:30 PM *Chaired by Frank Durgin, Swarthmore College*

1:30-1:45 PM (71)

Does Number Perception End at Twenty? FRANK H. DURGIN and MAKAYLA PORTLEY, Swarthmore College -We investigated a newly-proposed division in perceived nonsymbolic number using magnitude estimation. Visual number perception is generally divided into two domains: "subitizing" (up to about 5 items) and "estimation". New evidence points to a second division in number perception at about 20 dots. Below twenty, mean estimates are generally accurate and linearly related to actual number. Above twenty, underestimation is the rule, as indicated by power functions with mean exponents between .50 and .85. Previously we showed that the transition point is unrelated to density and does not vary with the range of numbers tested. Here we tested whether substantially increasing the allowed viewing time (from 0.5 s to 3 s) would raise the limit on accurate number perception beyond 20. It did not. However, more time did reduce intra-subject variability (CoV). CoVs grew for estimates from 5 to 20 dots, and then plateaued (at 0.24 or 0.21, depending on duration) at about 20 dots. The sharp compression of number estimates beyond 20

suggests that magnitude estimation tracks correlated perceptual information beyond 20, whereas approximately accurate visual number perception effectively ends at 20.

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1:50-2:05 PM (72)

Predictions Made Prior to Viewing a Scene Facilitate Scene Gist Perception. LESTER C. LOSCHKY and MAVERICK E. SMITH, Kansas State University - Feed-forward models posit that scene gist, a viewer's holistic semantic representation of a scene, is extracted as a blank-slate on every fixation. We investigated if expectations influence gist perception. Scenes were presented in ecologically valid, first-person viewpoint image sequences along spatiotemporally connected routes (e.g., bedroom to park). Participants identified target scenes at the end of rapid serial visual presentations. Importantly, we manipulated the spatiotemporal coherence of target scenes by presenting them in either coherent or randomized sequences. Targets in coherent sequences were categorized more accurately. To test whether such facilitation effects were due to shifts in response bias, participants in a second experiment performed a two-alternative forced-choice task in which they indicated whether the target was intact or phase-scrambled. Perceptual sensitivity, but not response bias, was greater for targets in coherent sequences. Thus, inconsistent with feed-forward accounts, scene gist acquisition does not begin as a blank-slate on every fixation.

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2:10-2:25 PM (73)

The Moon Size Illusion Does Not Improve Perceptual Judgments. GREGORY FRANCIS, BENJAMIN CUMMINS, and JIYOON KIM, Purdue University, LUKASZ GRZECZKOWSKI, Ludwig-Maximilian University of Munich, EVELINA THUNELL, Karolinska Institute - Recent studies suggest that the accuracy of perceptual judgments can be influenced by the perceived illusory size of a stimulus, with judgments being more accurate for increased illusory size. This phenomenon seems consistent with recent neuroscientific findings that representations in early visual areas reflect the perceived (illusory) size of stimuli rather than the physical size. We further explored this idea with the moon illusion, in which the moon appears larger when it is close to the horizon and smaller when it is higher in the sky. Participants (n=230) adjusted the orientation of an image of the moon on a smartphone to match the perceived orientation of the moon in the sky. Contrary to previous studies that investigated accuracy and size illusions, we found slightly lower perceptual judgment accuracy when the moon appeared large (close to the horizon) compared to when it appeared small (high in the sky). Email: Gregory Francis, gfrancis@purdue.edu

2:30-2:45 PM (74)

Object Memories Alter the Appearance of Blurry Object Borders. MARY A. PETERSON **Q**, *University of Arizona*, DIANA C. PEREZ, *Northwestern University* – Memories represent the norm of previously seen objects; for familiar objects, these probably have sharp borders because they have often been fixated/attended. Perception arises from integrating the current stimulus with memories. As a consequence, blurry borders may be perceived as sharper in familiar than novel objects. In Exp. 1, observers judged which of two objects simultaneously presented for 180ms had blurrier borders. One was familiar; the other was a matched novel object created by rearranging the parts of the familiar object. Across trials, one of the objects varied in blur from low to high levels (3-11; test); the other was a constant medium blur (7; standard). Both objects served as *standard* and *test* equally often (trials interleaved; L/R location balanced). Results showed the familiar object was perceived as sharper than the novel object, p < .001. In Exp. 2, observers judged whether the two objects were the same or different in blur. Again, results showed that blurry familiar objects were perceived as sharper, p <.001. Exp. 3 showed that long term memories can sharpen working memories of familiar but not novel objects, p = .003. Thus, object memories can alter the appearance of blurry borders of familiar objects. Email: Mary A Peterson, mapeters@email.arizona.edu

2:50-3:05 PM (75)

Oscillatory Visual Mechanisms Uncovered by Random Temporal Sampling. MARTIN ARGUIN, ROXANNE FERRANDEZ, and JUSTINE MASSÉ, Université de Montréal - The novel method of random temporal sampling served to tap oscillatory visual mechanisms through behavioural performance in visual recognition tasks using words, familiar or unfamiliar objects, or faces. Targets were overlaid with white visual noise and displayed for 200 ms. The signal-to-noise ratio (SNR) varied randomly through time (120 Hz rate). The sampling functions on each trial were coded either as the raw SNR, the Phase x Amplitude of its frequency components, or as the outcome of a time-frequency analysis of SNR. Accuracybased Z-scored classification images reflecting processing effectiveness were calculated for each participant and for each temporal sampling coding scheme. The classification images of the raw SNR and of the SNR's time-frequency profile were markedly modulated and highly distinct across stimulus classes. The SNR time-frequency classification images were extremely consistent across participants for a given task (up to .93). The Phase x Amplitude classification images were blank. Visual processing effectiveness is discontinuous through the first 200 ms of stimulus exposure and appears to involve a set oscillatory mechanisms that are differentially activated according to stimulus class.

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3:10-3:25 PM (76)

Reaction Times Versus Reaction Speeds. **JAMES** R. POMERANTZ, Rice University The reaction time (RT) literature frequently mentions fast RTs and speed - accuracy tradeoffs, but these terms refer to rates of processing, not to durations of processing on which RT models focus. Converting times to speeds is a nonlinear, reciprocal (power) transformation that can alter data patterns dramatically, making additive patterns become interactive. Factors like stimuli and tasks can affect the number of processing steps a task requires, as in the work of Donders and Sternberg. Other factors may affect the *rate* at which those steps are taken

(e.g., fatigue, age, and medical conditions may alter neural conduction speeds or frequency bands), something researchers have largely ignored. We model situations in which independent variables affect RT either by influencing the duration of processing (number of steps) required, the speed at which those steps are taken, or both. We present results from these models both in reaction times and reaction speeds.

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Decision Making I

519 B, Friday Afternoon, 1:30-3:30 PM

Chaired by David Broniatowski, The George Washington University

1:30-1:45 PM (77)

What is the Gist of the Fourfold Pattern of Risk? DAVID A. BRONIATOWSKI, George Washington University, VALERIE F. REYNA, Cornell University, DENIZ MARTI, George Washington University - Prospect Theory (PT) predicts a "Fourfold Pattern of Risk Attitudes:" risk seeking for lowprobability losses/high-probability gains, and risk aversion for high-probability losses/low-probability gains. Previously, subjects primarily exhibited this pattern for willingness-toaccept tasks. Per Fuzzy Trace Theory (FTT), subjects make binary choices using "some" vs. "none" gists, relying on verbatim representations only when necessary. FTT expects risk-aversion for gains and risk-seeking for losses for nonnegligible probabilities, that truncating complements removing categorical contrasts attenuates this pattern, and that reliance on verbatim representations varies with metacognition. We tested these hypotheses by administering binary risky choices online, manipulating framing (gain vs. loss) and probability (low vs. high), holding gamble rewards constant. Gists were measured as "some" or "none". We found risk-aversion for gains and riskseeking for losses regardless of probability. Effect sizes varied as expected with individual differences, gists, and truncation. Contrary to PT, the fourfold pattern seems limited to verbatim comparisons.

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1:50-2:05 PM (78)

Deciding at a Glance? The Influence of Integration Costs on Strategy Selection in Decision Making. THORSTEN PACHUR, Max Planck Institute for Human Development - It is generally assumed that when the costs of acquiring attribute information are low (e.g., when attributes are shown on the screen; "decisions from givens"), decision makers rely mostly on compensatory strategies, which integrate information across attributes. Some studies on decisions from givens, however, have found a predominant use of noncompensatory, onereason decision making strategies. I present evidence that these inconsistent findings might be due to an overlooked influence of the costs associated with integrating information on strategy selection. In a decision-making experiment, integration costs were manipulated both by the number of attributes shown for each object on the screen and by whether attribute values were coded with fixed vs. idiosyncratic symbols for each attribute. Bayesian multi-method strategy classification indicated that compensatory strategies were used only when integration costs were low (i.e., few attributes, fixed-symbol cue coding). Otherwise, participants predominantly relied on a noncompensatory strategy. Moreover, response times suggested that quick, compensatory information integration occurred only when the number of attributes was small.

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2:10-2:25 PM (79)

Urgency, Leakage, and the Relative Nature of Information Processing in Decision-making. JENNIFER S. TRUEBLOOD, Vanderbilt University, ANDREW HEATHCOTE, University of Tasmania, NATHAN EVANS, University of Amsterdam, WILLIAM HOLMES, Vanderbilt University - Over the last decade, there has been a robust debate in decision neuroscience and psychology about what mechanism governs the time course of decision making. The most prominent hypothesis is that neural architectures accumulate information over time until a threshold is met, i.e., the Evidence Accumulation hypothesis. However, most applications of this theory rely on simplifying assumptions, belying a number of potential complexities. Are there temporal dependences in information processing? Does urgency play a role? What about evidence leakage? Although recent investigations have addressed the latter questions, most studies have been piecemeal in nature. Here we develop a modeling framework, an extension of the Urgency Gating Model, in conjunction with a changing information paradigm to simultaneously address these questions. We find that 1) early information influences the processing of late information, 2) time varying urgency and evidence accumulation are of roughly equal importance, and 3) leakage is present with a time scale of about 200 ms. To our knowledge, this is the first comprehensive study to use a changing information paradigm to jointly and quantitatively estimate the temporal dynamics of human decision-making.

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2:30-2:45 PM (80)

Racing Against the Clock: Reinterpreting Evidence Accumulation in Speeded Decision Making. GUY E. HAWKINS, University of Newcastle, ANDREW HEATHCOTE, University of Tasmania - Many modern theories of decision making assume that observed decisions are the outcome of a latent process of accumulating evidence to a critical threshold. Although widely successful, a shortcoming of the standard theories is that all decisions are assumed to be based solely on the available evidence, which may not be true. We propose a new approach where some decisions might instead be triggered when a sufficient amount of time has been committed to a decision task. We describe how evidence-based and time-based decisions could operate in a latent competitive race architecture. Through applications to experimental data, we demonstrate that the new theoretical approach can provide novel insights into a range of classic experimental findings in the decision making literature including the speed-accuracy tradeoff and the relative speed of correct and incorrect responses, and more modern effects including response adaptations to externally-imposed deadlines on processing time.

2:50-3:05 PM (81)

Risk, Time, and Psychological Distance: Does Construal Level Theory Capture the Impact of Delay on Risk Preference? EMMANOUIL KONSTANTINIDIS, University of Leeds, JUNYI DAI, Zhejiang University, BENJAMIN R. NEWELL, University of New South Wales - Do risk preferences stay invariant across different time points? Construal Level Theory (CLT) postulates that temporal distance (or any other subjective or objective psychological distance) modulates the attention or importance placed on the features/dimensions of a risky prospect: payoffs and probabilities. Specifically, payoffs should attain a more prominent role in the future (long temporal distance), whereas in the present (short temporal distance) probabilities become the primary dimension. This differential weighting gives rise to different choice and judgment patterns depending on when in time a risky prospect is evaluated. Across five experiments, we systematically examined the conditions and factors that could moderate the effect. In addition, we present a mathematical formalisation of CLT, within the framework of Prospect Theory, to test and validate CLT's main assumptions and predictions about the effect of psychological distance on risk preferences. Both the behavioral observations and modeling results suggest the effect is labile, and if it does occur it is not adequately captured by a formal model of CLT. We discuss potential explanations why CLT cannot accommodate the impact of delay on risk preference.

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3:10-3:25 PM (82)

Howan Explicit Error Theory Provides a Better Understanding of Time Pressure Effects on Decision Making Under Risk. JÖRG RIESKAMP and SEBASTIAN OLSCHEWSKI, University of Basel (Presented by Jörg Rieskamp) - People frequently have to make decisions under time pressure. Time pressure might lead to a change in risk preferences or a change in decision strategies as past research suggest. However, we argue that when drawing conclusions about potential changes it is important to incorporate an explicit error theory when analyzing results. In two experiments, participants chose repeatedly between two risky gambles either with or without strict time limits. We analyzed the data with a stochastic utility model incorporating a specific error theory and estimated parameters in a hierarchical Bayesian framework. We found robust evidence that time pressure decreases choice consistency, thus leading to more errors. In contrast, we found no systematic influence of time pressure on neither risk nor complexity preferences. Finally, we found that more participants were classified as following a non-compensatory strategy, that is relying on single outcome comparison, under high as compared to low time pressure. We conclude that a robust analysis of the effect of time pressure on risky choice should incorporate a stochastic error theory to distinguish between preference shifts and a decrease in choice consistency.

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Recall I 520 B, Friday Afternoon, 1:30-3:10 PM Chaired by Colin M. MacLeod, University of Waterloo

1:30-1:45 PM (83)

Zeigarnik and von Restorff: The Memory Effects and the Stories Behind Them. COLIN M. MACLEOD, University of Waterloo – Bluma Zeigarnik (1927) first reported that memory is better for incomplete tasks, a phenomenon long known as the Zeigarnik effect. Hedwig von Restorff (1933) first reported that memory is better for isolated pieces of information, a phenomenon long known as the von Restorff effect. I will present: (1) a biographical sketch of the researcher behind each phenomenon, (2) a description of her research, and (3) a sketch of subsequent research, culminating in an evaluation of the current status of each phenomenon.

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1:50-2:05 PM (84)

They Forgot Their "Baby"?!: Factors that Cause Students to Forget Their Cell Phone. NATHAN S. ROSE, ABIGAIL C. DOOLEN, and ANDREA E. O'REAR, University of Notre Dame - Prospective memory (PM) is critical for daily life, yet errors happen often, even when there are dire consequences. What factors make errors more or less likely to occur? While most research explicitly instructs subjects to perform abstract tasks with little personal relevance, PM in daily life often involves personally relevant intentions that are more implicitly or incidentally encoded. When students came to the lab to participate in an unrelated experiment, we took their cell phone and attached an activity tracker to their clothes. We examined whether students would forget to retrieve their cell phone (personally relevant task) as often as they forgot to return the tracker (experimenter relevant task) before leaving the lab, and whether it mattered if the instructions were explicitly or more implicitly/incidentally encoded. Students only forgot the tracker 8-14% more often than their cell phone and explicit instructions did not reduce forgetting; neither did longer retention intervals nor a mismatch between encoding-retrieval context (Bayes Factors<2.6). At retrieval, (60-70%) participants said the intention "popped into mind". The role of processes outside of awareness in intention formation and retrieval is discussed.

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2:10-2:25 PM (85)

Faster Learners Forget More Slowly: Individual Differences in Rates of Learning and Forgetting in a Within-Subjects Study. KATHLEEN B. MCDERMOTT Ω , Washington University in Saint Louis, CHRIS ZERR, Washington University in St. Louis – Recent individual differences work using a multitrial learning procedure has demonstrated a relation between learning speed and retention (Nelson et al., 2016; Zerr et al., 2018) such that quicker learners tend to have better memory on a single delayed test. Here we ask whether learning speed predicts the shape of forgetting functions when the same group of people (N= 148) is tested at 5 delays ranging from 1 min to 1 month. Results demonstrate that quicker learners indeed have shallower forgetting curves and forget at a slower rate, a finding that is contradictory to several studies that find constant rates of forgetting. We also examine whether characteristics of participants (e.g., age, vocabulary, strategy usage) have any additional bearing on the rate of forgetting, as well as whether people have accurate judgments and predictions about their own memory performance over time.

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2:30-2:45 PM (86)

Visual Imagery Ability and Memory for Word Pairs. JEREMY B. CAPLAN and JEREMY THOMAS, University of Alberta - Visual imagery benefits memory for word pairs, when spontaneously produced by participants, and when explicitly instructed. However, these methods rely on subjective report or compliance with instructions, respectively, leaving the precise role of visual imagery unclear. Sanchez (2019) found correlations between objective visual-imagery measures and use of the method of loci. In a similar approach, we asked whether an objective (paper-folding task) and subjective (vividness of visual imagery questionnaire) could explain individual differences in a paired associate task. Results revealed positive correlations between paper-folding accuracy and cued recall, associative recognition and order recognition of pairs (r>0.3, p<0.05). Correlations with the subjective measure were not significant (r<0.1, p>0.3). Thus, mental simulation ability, but not subjective impressions of vividness, may be relevant for association memory. Visual imagery may thus not be entirely epiphenomenal, and particular characteristics of imagery could be the key to understanding association-memory and influences of individual differences.

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2:50-3:05 PM (87)

On the Memory Benefits of Repeated Study with Variable Tasks. MACIEJ HANCZAKOWSKI, SWPS University, EDWARD L. WILDING, University of Nottingham, KATARZYNA ZAWADZKA, SWPS University - Encoding variability refers to the situation in which repeated items are processed in different ways on each presentation. Superior memory performance resulting from encoding variability is argued to underlie important phenomena in human memory such as the spacing effect. However, the memory benefits of encoding variability are often elusive. We investigated encoding variability when participants studied words with the same or different orienting tasks across repetitions. We have found the benefits of variable encoding to depend upon the number of learning cycles and the retrieval demands at test. These results are interpreted in light of a distinction between different components of memory representations established at study, suggesting that encoding variability promoted via different orienting tasks fosters elaborate encoding of semantic features. This augmented semantic component benefits memory only when a memory test is utilized that taps semantic features of memory representations, minimizing the role of contextual and relational factors.

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Skill Acquisition 520 C, Friday Afternoon, 1:30-3:10 PM Chaired by Joo-Hyun Song, Brown University

1:30-1:45 PM (88)

Improved Motor Timing Enhances Time Perception. JOO-HYUN SONG and JIANFEI GUO, Brown University, ZHAORAN ZHANG and DAGMAR STERNAD, Northeastern University (Presented by Joo-Hyun Song) - When simple movements, i.e. finger tapping, were performed in an explicitly rhythmic fashion, participants with larger tapping timing variability also demonstrated lower acuity in time perception (Keele et al., 1985). However, does the inherent timing of more complex movements also affect time perception? Here, we examined whether practicing a sequence of throwing movements enhances the sensitivity of time-interval discrimination. Participants (n=14) practiced throwing a ball to hit a target in a virtual environment for 4 daily sessions, where they stabilized the ball release time. Following each throwing session, they also conducted an auditory time-interval discrimination task. We found that with throwing practice, they enhanced time discrimination selectively for the interval close to the release time, but not for others. The magnitude of motor timing improvement also predicted the enhancement of timeinterval discrimination within each individual. We showed that improvement of motor timing embedded in a more complex motor task could enhance the sensitivity of time perception. Thus, we suggest that there is a shared temporal mechanism between perception and movement regardless of rhythmicity or complexity of the motor tasks.

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1:50-2:05 PM (89)

What Changes when Repeating Simple Decisions? SCOTT D. BROWN, University of Newcastle, DAVID GUNAWAN, University of New South Wales, GUY E. HAWKINS, University of Newcastle, MINH-NGOC TRAN, University of Sydney, ROBERT KOHN, University of New South Wales (Presented by Scott D. Brown) - Many psychological experiments have participants repeat a simple task. This repetition is often necessary in order to gain the statistical precision required to answer questions about quantitative theories of the psychological processes underlying performance. In such experiments, timeon-task can have important and sizeable effects on performance, changing the psychological processes under investigation in interesting ways. These changes quite often ignored, and the data are treated as stationary. We leverage modern statistical approaches to extend a stationary model of decision-making to account for changes with time-on-task. In data from three highly cited experiments, we show that there are changes in performance with time-on-task, and that these changes vary substantially over individuals - both in magnitude and direction. Model-based analysis reveals how different cognitive processes contribute to the observed changes. We find strong evidence in favor of an auto-regression process governing the time-based evolution of individual subjects' model parameters.

Our analysis approach has applications beyond the experiments and model we investigate; the central idea can be applied generally to quantitative psychological theories.

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2:10-2:25 PM (90)

A Computational Analysis of Task Switching in Large-Scale Data from Lumosity. MARK STEYVERS, University of California, Irvine, GUY HAWKINS, FRINI KARAYANIDIS, and SCOTT D. BROWN, University of Newcastle - An important feature of human cognition is the ability to flexibly and efficiently adapt behavior in response to continuously changing contextual demands. We leverage a large-scale dataset from Lumosity, an online cognitive training platform, to investigate how cognitive processes involved in cued switching between tasks are affected by level of task practice across the adult lifespan. We develop a computational account of task switching that specifies the temporal dynamics of activating task-relevant representations and inhibiting task-irrelevant representations, and how they vary with extended task practice across a number of age groups. Practice modulates the level of activation of the task-relevant representation and improves the rate at which this information becomes available. While longterm practice improves performance across all age groups, it has a greater effect on older adults. Indeed, extensive task practice can make older individuals functionally similar to less practiced younger individuals.

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2:30-2:45 PM (91)

From Algorithm to Retrieval: Skill Acquisition in Dynamic Spatial Environments. BROOKE N. MACNAMARA, Case Western Reserve University, DAVID J. FRANK, Texas A&M University, Commerce (Presented by Brooke Macnamara) - In 1964, Fitts put forth three stages of skill acquisition: effortful cognitive processes, less effortful retrieval-based processes, and ultimately autonomous processes. In subsequent years, numerous studies largely confirmed Fitts's original ideas leading to multiple nuanced theories (e.g., Anderson, 1993; Logan, 1988; Palmeri, 1997; Rickard, 1997) on how this shift from effortful algorithmic processing towards effortless retrieval-based processing occurs. However, these theories are based primarily on static, verbal/mathematic tasks. By contrast, studies of dynamic interception tasks typically ignore Fitts' stages and instead assume purely algorithmic processes regardless of practice (e.g., Bootsma, Ledouit, Casanova, & Zaal, 2015). Across multiple studies, we demonstrate that in dynamic, spatial interception tasks, people appear to shift from algorithm to retrieval for practiced trials. Interestingly, we also find that retrieval shifts are collective, rather than item-specific-in direct contrast to studies using verbal or mathematical materials. We discuss implications for the previously mentioned theories of skill acquisition.

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2:50-3:05 PM (92)

Cognitive Violations Cause Medical Errors: Using Auto-Injectors. RUTH S. DAY, ANGELA CALDWELL, and TAYLOR IKNER, Duke University - Many people have lifethreatening allergic reactions to insect bites, nuts, and other agents. Left untreated, they can experience anaphylaxis and even death. They require an immediate injection in order to survive. Some carry an auto-injector device so they can selfinject the needed medication immediately. However, both caregivers and patients often make errors and fail to deliver the needed dose. Medical investigators attribute this failure to poor device design or inadequate training. However, the written instructions provided with auto-injectors violate multiple cognitive principles and could potentially cause medical errors. Participants saw either the Original instructions packaged with the device or an Enhanced version we designed based on established and novel cognitive principles. Then we tested them in both cognition and action tasks. Most of the Enhanced group would deliver the needed medication in everyday life, while most of the Original group would not. Email: Ruth S. Day, ruthday@duke.edu

> Language and Meaning 520 F, Friday Afternoon, 1:30-3:10 PM Chaired by Penny Pexman, University of Calgary

1:30-1:45 PM (93)

Mapping Semantic Space: Property Norms and Semantic Richness. PENNY M. PEXMAN, EMIKO J. MURAKI, and DAVID M. SIDHU, University of Calgary (Presented by Penny Pexman) - Variability in the number of features (NoF) provided for words in feature listing tasks has been used as a measure of a concept's semantic richness. Lexical-semantic task responses tend to be facilitated for words with high NoF compared to those for words with low NoF. This previous work was limited, however, to relatively small word sets. New norms provide NoF values for many more items (Buchanan et al., 2019). We tested whether NoF effects generalize to this larger item set and explored how NoF is related to other measures of semantic richness, including concreteness, imageability, bodyobject interaction, sensory experience, valence, arousal, age of acquisition, semantic diversity, and lexical centrality. Using the Buchanan norms we found significant NoF effects in lexical and semantic decision tasks. Further, factor analyses of all semantic richness measures showed a distinct factor structure, suggesting that there are clusters of semantic richness dimensions that seem to correspond, for instance, to more embodied dimensions and more distributional dimensions. Results are interpreted as evidence that semantic representation is multimodal and multidimensional and provide new insights about the structure of semantic space.

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1:50-2:05 PM (94)

A Practical Primer on Processing Semantic Property Norm Data. ERIN M. BUCHANAN, Harrisburg University of Science and Technology, SIMON DE DEYNE, The University of Adelaide, MARIA MONTEFINESE, University of Padua

- Semantic property listing tasks require participants to generate short propositions (e.g., <barks>, <has fur>) for a specific concept (e.g., dog). This task is the cornerstone of the creation of semantic property norms which are essential for modelling, stimuli creation, and understanding similarity between concepts. However, despite the wide applicability of semantic property norms for a large variety of concepts across different groups of people, the methodological aspects of the property listing task have received less attention, even though the procedure and processing of the data can substantially affect the nature and quality of the measures derived from them. The goal of this presentation is to provide a practical primer on how to collect and process semantic property norms. We propose and demonstrate a processing pipeline that transparently documents choice decisions resulting in improved comparability across different studies. The impact of these choices will be demonstrated using intrinsic (e.g. reliability, number of properties) and extrinsic measures (e.g., categorization, semantic similarity, lexical processing). Email: Erin M. Buchanan, ebuchanan@harrisburgu.edu

2:10-2:25 PM (95)

Examining Semantic Preview Effects Using a Stroop Boundary Paradigm. SIMON P. LIVERSEDGE, University of Central Lancashire, ZHICHAO ZHANG, Tianjin Normal University, FEDERICA DEGNO and CHUANLI ZANG, University of Central Lancashire - There has been controversy regarding whether semantic information is extracted parafoveally in reading. Because Chinese is an unspaced and densely packed language, readers may process parafoveal words to a greater extent than they do in spaced alphabetic languages. In a novel Stroop boundary paradigm (Rayner, 1975), participants read sentences containing either a single-character color-word whose preview was manipulated (identity or pseudocharacter printed in black [no-color], a congruent or an incongruent color). Two boundaries were used, one positioned two characters before the target and one immediately to the left of the target. The previews changed from black to color and then back to black as the eyes crossed each boundary. Reading times were increased for colored compared to no-color previews indicating a parafoveal visual interference effect. Importantly, there were no robust interactive effects - preview effects were comparable for congruent and incongruent color previews. Email: Simon P. Liversedge, SPLiversedge@uclan.ac.uk

2:30-2:45 PM (96)

Timecourse of Number-of-Features Effects in Spoken Word Recognition. MELVIN J. YAP and WINSTON D. GOH, *National University of Singapore*, EMIKO J. MURAKI, DAVID M. SIDHU, and PENNY M. PEXMAN, *University of Calgary* – Despite the proliferation of work examining semantic effects in visual word recognition, the extent to which semantic richness plays a role in spoken word recognition is less well understood. Extant work (e.g., Goh et al., 2016) has also been based on relatively small sets of words and is, for the most part, silent on the timecourse of effects. Leveraging on Buchanan et al.'s (2019) new feature listing database, the present study focuses on the facilitatory influence of number of features (NOF) on the processes that compute meaning from speech. We conducted

survival analyses using piece-wise exponential additive mixed models to examine the time-varying effects of NOF across multiple spoken word recognition datasets (lexical decision and semantic categorization). This method allowed us to investigate how the effect of NOF varies based on response duration. The theoretical implications of findings are discussed. Email: Melvin J. Yap, melvin@nus.edu.sg

2:50-3:05 PM (97)

Feature Distinctiveness Effects in Language Acquisition and Lexical Processing: Insights from Megastudies. CYNTHIA S.Q. SIEW, National University of Singapore - Semantic features are central to many influential theories of word meaning and semantic memory, but new methods of quantifying the information embedded in feature production norms are needed to advance our understanding of semantic processing and language acquisition. This paper capitalized on databases of semantic feature production norms and age-of-acquisition ratings, and megastudies including the English Lexicon Project and the Calgary Semantic Decision Project, to examine the influence of feature distinctiveness on language acquisition, visual lexical decision, and semantic decision. A feature network of English words was constructed such that edges in the network represented feature distance, or dissimilarity, between words, enabling us to quantify the relative feature distinctiveness of individual words relative to other words in the network. Words with greater feature distinctiveness tended to be acquired earlier. Regression analyses of megastudy data revealed that feature distinctiveness inhibited performance on the visual lexical decision task, but facilitated performance on the semantic decision task.

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Event Cognition 520 C, Friday Afternoon, 3:30-5:30 PM *Chaired by Norman Brown, University of Alberta*

3:30-3:45 PM (98)

Me, You, and Harry Potter: On the Organization and Retrieval of Personal-Event Memories, Vicarious-Event Memories, and Fictional-Event Memories. NORMAN R. BROWN, University of Alberta, LIANGZI SHI, College of New Caledonia, PEGGY ST. JACQUES, University of Alberta - Two studies examined what personal-event memories, vicarious-event memories and fictional-event memories have in common. To do this, we selected well-established autobiographical memory (AM) methods (timed word-cued and event-cued event retrieval, retrieval-strategy menus, event-pair relation menus, memorycharacteristics ratings) and used them to compare directly AM with (a) vicarious memory (VM) and (b) event memories derived from the Harry Potter (HP) series. Across event type, direct retrieval was common when participants responded to word cues (≈60%) and even more common when they responded to event cues (≈80%). In all three conditions, event cues often elicited *cluster-mates*, though clustering was more common in the HP condition (75%) than in the AM (65%) or VM (67%) condition. There was also a strong relationship between event type and memory perspective: AMs were typically recalled from a first-person perspective; HP memories from a third-person perspective; and VMs from a first-person perspective when the participant was present and a third-person perspective when s/ he was absent. We conclude that perceptual/sensory encoding is event-type specific and retrieval/organizational processes are event-type independent.

Email: Norman R. Brown, nrbrown@ualberta.ca

3:50-4:05 PM (99)

Effects of Pre-Existing Knowledge and Scene Boundary on Temporal Memory. IRENE P. KAN, KENDRA ANDREW, ANNA B. DRUMMEY, and ANNA R. GJERTSEN, Villanova University (Presented by Irene Kan) - We investigated the role of prior knowledge on memory for the temporal characteristics of an unfolding episode. Subjects watched episodes from two television shows, one from a familiar show (Friends) and one from an unfamiliar show (Mad About You). After watching each show, subjects viewed still frames with captions from the episode and identified when within the episode the scene took place. Half the scenes were taken near scene boundary points and the other half were taken from non-boundary points. Consistent with the temporal perception literature, we found an asymmetrical effect of prior knowledge on temporal memory: When making temporal estimations of scenes from the familiar show, subjects tended to over-estimate, but when making temporal estimations of scenes from the unfamiliar show, subjects tended to under-estimate. Finally, subjects provided more accurate estimates for the near boundary scenes than non-boundary scenes, but this benefit was observed only for the unfamiliar show.

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4:10-4:25 PM (100)

Memory for the Sources of Actions and Words. ALAN W. KERSTEN, JULIE L. EARLES, MEGAN SMITHWICK, and COLIN S. FRANK, Florida Atlantic University - Source memory paradigms often employ verbal material as target information, but memory for the sources of actions (i.e., who did what) may be even more important to everyday functioning. Participants in the present research viewed videos involving a set of actors either performing different actions or speaking verb phrases describing those actions (e.g., drop the ball). In a later recognition test, participants were tested on their ability to discriminate old items from items involving new actors or actions/phrases (thus testing memory for the component features of the events), as well as from items involving novel conjunctions of familiar actors and actions/phrases (thus testing memory for the sources of those actions/phrases). Discrimination of these conjunction items from old items was better in the action condition than in the verbal condition, indicating better memory for the sources of actions than for words. The action condition also exhibited better memory for both of the component features of the events, suggesting that the enhanced source memory performance in that condition reflected better memory for actions than for words and better memory for actors when they were performing physical actions rather than speech acts.

Email: Alan Kersten, akersten@fau.edu

4:30-4:45 PM (101)

Guidance of Vision by Memory Retrieval During Event Comprehension. JEFFREY M. ZACKS and DAVID STAWARCZYK, Washington University in Saint Louis, MICHELLE L. EISENBERG, LocateAI, CHRISTOPHER N. WAHLHEIM, University of North Carolina at Greensboro - An important function of episodic memory is to use information about recent events to guide predictions about current events. Here, prediction was assayed by tracking viewers' anticipatory looking to objects that an actor was about to interact with. Viewers first saw a movie depicting a series of everyday events in one actor's day. They then watched another movie that included items that repeated and also items that began the same as a previously-seen event but ended differently. During the beginning of changed events, viewers tended to look to objects that were formerly the targets of actions, indicating that they had predicted the actor would interact with these objects again, and thus made prediction errors. Errors in predictive looking were associated with better subsequent memory for changed items. This finding suggests that prediction errors serve as triggers to update event representations, leading to superior encoding by systems subserving long-term memory. Email: Jeffrey M Zacks, jzacks@wustl.edu

4:50-5:05 PM (102)

Same Activity, Different Events: Culture Impacts Event Segmentation. KHENA M. SWALLOW and QI WANG, Cornell University - Investigations into the factors that contribute to the identification of a boundary between two events tend to focus on concrete sensory information, such as visual motion, more abstract information related to actor's goals, and recurring statistical dependencies in everyday events. Largely overlooked, however, are characteristics of the viewer that may impact how an experience is attended and conceptualized. We will present new findings examining whether viewers from the US and India identify similar events in activities filmed in their own, or in a different cultural setting. For both settings, US viewers and Indian viewers segmented the activities at different rates and differed in how strongly their event boundaries were associated with visual changes and goal changes. However, there was no evidence that the match between a viewer's culture and the activity setting influenced segmentation. This suggests that differences in how viewers prioritize different sources of information may influence event segmentation. Email: Khena Swallow, kms424@cornell.edu

5:10-5:25 PM (103)

Experienced and Referent Event Structures. GABRIEL A. RADVANSKY, *University of Notre Dame*, ANDREA E. O'REAR, *Saint Mary's College* (Presented by Gabriel Radvansky) – It is well-known that event structure can influence later memory. However, the interaction between experienced event structure and referent event structure has not been extensively explored. In two experiments, we demonstrate that both of these factors contribute to later performance. In Experiment 1, sentence triples were either presented together (one experienced event) or distributed across three list positions (three experienced events). These triples referred to either a common situation (one referent event) or different situations (three referent events). In Experiment 2, texts either had one narrator (one experienced event) or two (two experienced events). These narrators discussed either one topic (one referent event) or two (two referent events). Across both experiments, memory was better when information learned in multiple experienced events referred to a common referent event. This parallels recent work in prospective memory. Thus, event cognition can be influenced by event structures at multiple levels.

Email: Gabriel A. Radvansky, gradvans@nd.edu

Spatial Cognition I 520 B, Friday Afternoon, 3:30-5:30 PM Chaired by Amy Shelton, Johns Hopkins University

3:30-3:45 PM (104)

Mental Simulation of Block Construction Aligns with Physical Construction Biases. AMY L. SHELTON, CATHRYN S. CORTESA, MINGYU YANG, and BARBARA LANDAU, Johns Hopkins University (Presented by Amy Shelton) - Copying a block structure requires spatial representations combined with physical actions. In prior work, we found that adults copied structures via highly constrained 'build-paths', using the principle of 'layering'-first completing the bottom layer, then proceeding to the next layer. Here, we ask whether this layering bias is a consequence of physical building or is also exhibited in non-building contexts. We asked adults to complete one of two computerized tasks: In the Mental Simulation task, they were shown a model and a partial structure of it and were asked to judge whether a second partial structure was a correct step towards completing the full structure. In the Part task, adults were shown the same model and partial structure and were asked to judge whether the partial structure was a part of the full structure. Both tasks revealed systematic biases to endorse partial structures that represented a complete horizontal layer of the model (compared with those that crossed layers or did not have fully supported blocks). These results suggest that this 'layering' principle reflects how adults represent spatial structures, whether or not they are actively building them. Email: Amy Shelton, ashelton@jhu.edu

3:50-4:05 PM (105)

Sex Differences in Tests of Mental Rotation with Blocks and Human Figures: Evidence from Eye Movements. JEAN SAINT-AUBIN, Universite de Moncton, DANIEL VOYER and KATEY ALTMAN, University of New Brunswick, GENEVIEVE GALLANT, Universite de Moncton, RANDY A. DOYLE, Minerva Schools at KGI - This paper reports work where we examined how the effects of strategy might account for the male advantage in mental rotation. Specifically, we tested the hypothesis that men would favor a holistic strategy whereas women would favor a piecemeal strategy. Indirect support for this view came from studies showing better performance and reduced sex differences when blocks are replaced by human bodies, which would be more likely to be processed holistically. In three experiments, eye movements were monitored while participants performed the rotation task with blocks and human bodies. Men outperformed women in all experiments. A free viewing procedure was used in Experiment 1, and an eye contingent display was used in Experiment 2 to force participants to use a piecemeal strategy and in Experiment 3 to force them to use a holistic strategy. Results failed to support strategy selection as an explanation for sex differences in this task.

Email: Jean Saint-Aubin, jean.saint-aubin@umoncton.ca

4:10-4:25 PM (106)

Are Attentional Momentum and Representational Momentum Related? TIMOTHY L. HUBBARD, Arizona State University, Grand Canyon University, SUSAN E. RUPPEL, University of South Carolina, Upstate - In representational momentum, memory for the location of a previously viewed target is displaced in the direction of motion. In attentional momentum, detection of a target in the direction of an attention shift is faster than detection of a target in a different direction. Hubbard (2015, 2017) hypothesized that attentional momentum might be related to representational momentum. Two experiments collected measures of attentional momentum and representational momentum. In Experiment 1, attentional momentum (based on differences between detecting probes opposite or orthogonal to a cued location) negatively correlated with representational momentum (based on cursorpositioning). In Experiment 2, attentional momentum (based on facilitation in detecting a gap on a probe presented in front of the final target position) negatively correlated with representational momentum (based on probe judgment). Several implications of the findings for the relationship of attentional momentum and representational momentum, and for theories of momentumlike effects more generally, are considered.

Email: Timothy L. Hubbard, timothyleehubbard@gmail.com

4:30-4:45 PM (107)

Teleporting Through Virtual Environments. JONATHAN W. KELLY, LUCIA A. CHEREP, ALEX F. LIM, ALEC G. OSTRANDER, and STEPHEN B. GILBERT, Iowa State University - The most natural way to explore a virtual environment is to walk and turn, but this is often impossible due to technological limitations and space limitations. Teleporting has become a popular interface, whereby the user indicates the desired location, and sometimes orientation, in the virtual environment and is then transported without self-motion cues. To evaluate the effects of teleporting on navigation, participants performed a triangle completion task by traversing two outbound path legs before pointing to the unmarked path origin. Locomotion was accomplished via walking or two common implementations of the teleporting interface which varied in availability of rotational self-motion cues. Walking produced smaller errors than teleporting, and rotational self-motion cues were beneficial. Geometric boundaries were necessary to mitigate the consequences of teleporting; landmarks were helpful only in the context of boundaries. Traditional measures of spatial ability were not predictive of performance, but men outperformed women when teleporting.

Email: Jonathan Kelly, jonkelly@iastate.edu

4:50-5:05 PM (108)

Symmetry of Pedestrian Route Choice on a College Campus. ELIZABETH R. CHRASTIL, DANIEL R. MONTELLO, and RIE C. DAVIS, University of California, Santa Barbara -Psychological research on route choice has typically focused on decision-making heuristics. Route choices depend both on the quality of spatial knowledge and on the attributes people attempt to optimize when choosing routes, such as distance, time, safety, etc. We focus in this study on symmetry-to what extent travelers choose the same route going from A to B and from B to A. We had 60 undergraduates wear GPS-enabled watches as they walked a multi-segment route on campus. Eight segments were constructed between four different places on campus such that four of the segments made up two pairs of origin-destination reversals. These reversals allowed us to examine route symmetry when students traveled from A to B and from B to A. To quantify route dissimilarity, we coded the two reversal pairs as same or different, and we developed a metric measure (standardized to compare routes that had differing optimal lengths), which we applied both within and between subjects.

Email: Elizabeth Chrastil, chrastil@ucsb.edu

5:10-5:25 PM (109)

Bayesian Decision Theory and Navigation. TIMOTHY P. MCNAMARA, Vanderbilt University - Effective navigation depends on the ability to combine information from multiple spatial cues to estimate one's position and the locations of goals. Spatial cues include landmarks, and other visible features of the environment, and body-based cues generated by selfmotion (vestibular, proprioceptive, & efferent information). A number of experiments have investigated the extent to which visual cues and body-based cues are combined optimally according to statistical principles. Although several studies have documented optimal or near-optimal cue combination, other studies have shown that navigators sometimes fail to combine cues optimally or even at all. Possible limitations of all of these investigations are that they have not accounted for navigators' prior experiences with or assumptions about spatial cues and have not tested complete decision models. In this presentation, I will examine whether apparent violations of optimal cue combination can be explained by incorporating informative priors or appropriate loss functions in decision-theoretic models.

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Reasoning 520 F, Friday Afternoon, 3:30-5:30 PM Chaired by Jay Russo, Cornell University

3:30-3:45 PM (110)

A Process Theory of Wason's 2-4-6 Task. JAY RUSSO, *Cornell University*, MARGARET G. MELOY, *Pennsylvania State University* – A process trace of rule discovery during Wason's 2-4-6 tasks yields a process theory focusing on its sequential structure and on the critical role of hypothesis generation. Our theory includes (a) a partition of the discovery process into two phases (distal and proximal) and (b) a partition of



each phase into four steps (test, feedback, hypothesis revision, and eventual rule discovery or failure). One previously underappreciated finding is the essential function of hypothesis changes, both small refinements and complete replacements. The necessary role of hypothesis generation was supported by two manipulations designed to increase the number of distinct hypotheses: delaying feedback and working in groups. Both succeeded in generating more hypotheses and both increased rule discovery. However, the success of different tactics for both disqualifying existing hypotheses and producing new ones cannot be straightforwardly generalized from the 2-4-6 problem to natural rule discovery tasks.

Email: J. Edward Russo, jer9@cornell.edu

3:50-4:05 PM (111)

Why is Logic So Likeable? A Single-Process Account can Explain Intuitive and Explicit Sensitivity to Argument Validity. BRETT K. HAYES and PEGGY WEI, University of New South Wales, JOHN C. DUNN, University of Western Australia, RACHEL STEPHENS, University of New South Wales - Four experiments examined recent claims that people can intuitively assess the logical validity of arguments, and that qualitatively different reasoning processes drive intuitive and explicit validity assessments. Participants evaluated arguments varying in validity and believability via a rating of argument validity (logic task) or an affective response (liking task). All experiments found sensitivity to validity on liking as well as logic tasks. However, challenging the role of intuition, sensitivity to validity was reduced when liking ratings were made under concurrent memory load (Experiments 1-2) or by individuals with lower working memory capacity (Experiments 3-4). Formal signaldetection models of reasoning were tested against the data using signed difference analysis (cf. Stephens, Dunn, & Hayes, 2018). A single-process reasoning model assuming a single latent dimension for assessing argument strength but different response criteria for liking and logic tasks was consistent with the data from each experiment. These results show that intuitive and explicit judgments of argument validity can be explained by a single reasoning process.

Email: Brett Hayes, b.hayes@unsw.edu.au

4:10-4:25 PM (112)

A Metacognitive Perspective on Self-Assessment of Originality. RAKEFET ACKERMAN, Technion--Israel Institute of Technology, YAEL SIDI, Open University of Israel, ILAN TORGOVITSKY, Technion--Israel Institute of Technology (Presented by Rakefet Ackerman) - Metacognitive research is mostly focused on well-defined tasks, such as learning, memory, and problem solving. The metacognitive processes involved in ill-defined tasks are yet to be explored. The present study introduces a novel metacognitive self-judgment of originality that is assumed to accompany creative thinking. By using a Divergent Thinking Task-offering uses for daily objects (e.g., a brick), we examined the reliability, potential biases, and factors affecting people's originality judgments regarding the uses they generate. Three experiments demonstrate that people accurately acknowledge the serial order effect-judging later ideas as more original than earlier ideas. However, people systematically judge their ideas as less original than they actually were. Manipulations

affecting actual originality level and those designed to affect originality judgments expose this resilient under-confidence bias in self-assessments of originality, combined with a double dissociation between judgments and performance. This study provides a new perspective on creativity processes. Email: Rakefet Ackerman, ackerman@ie.technion.ac.il

4:30-4:45 PM (113)

Genesis or Evolution of Gender Differences? Worldview-Based Dilemmas in The Processing of Scientific Information. STEPHAN LEWANDOWSKY, University of Bristol, JAN K. WOIKE, Max Planck Institute for Human Development, KLAUS OBERAUER Q, University of Zurich - Some issues that have been settled by the scientific community, such as evolution, the effectiveness of vaccinations, and the role of CO2 emissions in climate change, continue to be rejected by segments of the public. This rejection is typically driven by people's worldviews, e.g., free-market endorsement predicts rejection of climate change. We report a large (N>1,000) preregistered study that examined how liberals and conservatives resolve dilemmas in which an issue triggers two opposing facets of their worldviews. We examined attitudes on gender equality and the evolution of sex differences-two constructs that may create conflicts for liberals (who endorse evolution but also equality) and conservatives (who endorse gender differences but are sceptical of evolution). We find that many conservatives reject both gender equality and evolution of sex differences, and instead embrace "naturally occurring" gender differences. Many liberals reject gender differences, while strongly endorsing evolution, including evolved gender differences.

Email: Stephan Lewandowsky, stephan.lewandowsky@bristol. ac.uk

4:50-5:05 PM (114)

Stumpers: Learning Psychology from Riddles. MAYA BAR-HILLEL, *The Hebrew University of Jerusalem* – Stumpers are riddles which are so simple that kids can solve them, yet their answers are so elusive that many adults fail to solve them. They are stumped. Example: "2 Italians are sharing a pizza. The older Italian is the brother of the younger Italian, but the younger Italian is not the brother of the older Italian. How is that possible?" The psychology underlying stumpers relies on the fact that the dominant representation that the riddle's text conjures does not contain the answer, and it must be modified to reach a solution. What determines the dominant representation? Different riddles are driven by different principles. The riddles are a vehicle for discovering these principles, some of which turn out to be novel

Email: Maya Bar-Hillel, maya@huji.ac.il

5:10-5:25 PM (115)

Inference by Exclusion in a Grey Parrot ("Psittacus erithacus"): Results of a 4-Cup Task. IRENE M. PEPPERBERG, Harvard University, SUZANNE L. GRAY, Tufts University, FRANCESCA M. CORNERO, Harvard University, SHILPA MODY, Facebook, SUSAN CAREY, Harvard University – Many species successfully reason by exclusion in a two-cup task: one (unknown) contains a treat, one is shown as empty; subjects

mostly seek the remaining cup. Such behavior is assumed to demonstrate deductive reasoning via the disjunctive syllogism (A or B; not A, therefore B.) Undermining this conclusion of *deductive certainty* are children's results from a 4-cup (AB, CD) version—each pair contains one treat (e.g., A, C); one (e.g., B) is shown as empty; children chose among the three remaining cups at random (2½-year-olds), or A 50% of the time (3-year-olds). A Grey parrot, however, chose A with 94% accuracy, p<.001, out-performing 5-year-olds. An additional experiment ensured he was not simply picking the cup next to the empty one: Some trials incentivized gambling (choosing C or D) via a much-preferred treat in the 50% side. He primarily gambled. The parrot likely computed degrees of certainty and reasoned by exclusion.

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Cognitive Control II 518 A, Friday Afternoon, 3:50-5:30 PM Chaired by Adam Reeves, Northeastern University

3:50-4:05 PM (116)

Learning to Shift Attention Right-to-Left while Saccading Left-to-Right. ADAM REEVES, Northeastern University - Subjects first monitored an RSVP stream of letters for an unpredictable target, and then shifted attention to a stream of numerals 3.6deg away, reporting the first four they could. In pro-shifting, subjects moved their eyes with attention; in antishifting, in the opposite direction. Characters were presented rapidly (10 Hz) so naming them was impossible and numeral reports had to come from visual memory. At 10Hz, full attention must be paid to the letter stream for the subject to detect the target, forcing subjects to shift. Results: Pro-shifting is easy, but to proficiently anti-shift takes weeks of practice. One subject failed to do so. For the other five, compared to proshifts, anti-shifts delayed the saccade latency by only 36ms, the motor reaction time to the C by only 10ms, and the attention shift latency (the ART) or time from target onset to onset of the first reported numeral (Reeves and Sperling, Psychol. Rev. 93) by only 27ms. Numeral reports were only 7% less accurate in anti-shifts. Movements of the eye and of attention are not automatically yoked.

Email: Adam Reeves, a.reeves@northeastern.edu

4:10-4:25 PM (117)

Mental Attribution is Not Sufficient or Necessary to Trigger Attentional Orienting to Gaze. ALAN KINGSTONE, GEORGE KACHKOVSKI, DANIIL VASILYEV, and MICHAEL KUK, *University of British Columbia*, TIMOTHY N. WELSH, *University of Toronto* – Attention can be shifted in the direction that another person is looking, but the role played by an observer's mental attribution to the looker is controversial. And whether mental attribution to the looker is sufficient to trigger an attention shift is unknown. The current study introduces a novel paradigm to investigate this latter issue. An actor is presented on video turning his head to the left or right before a target appears, randomly, at the gazed-at or nongazed at location. Critically, an actor is wearing two identical masks – one covering his face and the other the back of his head. Thus, after the head turn, participants are presented with the profile of two faces, one looking left and one looking right. For a gaze cuing effect to emerge, participants must attribute a mental state to the actor – as looking through one mask and not the other. Over the course of four experiments we report that when mental attribution is necessary, a shift in social attention does not occur; and when mental attribution is not necessary, a shift in social attention does occur. Thus, mental attribution is neither sufficient nor necessary for the occurrence of an involuntary shift in social attention.

Email: Alan Kingstone, alan.kingstone@ubc.ca

4:30-4:45 PM (118)

On the Detection of Eye Gaze Direction: Another Look. DEREK BESNER and DAVID MCLEAN, University of Waterloo - We provide another look at the claim that the detection of eye gaze direction is an "automatic" process. Using an interference criterion, we report experiments in which (i) eye gaze direction is the task and arrow direction on the face is irrelevant ((left/ right; congruent; incongruent), and (ii) other experiments with the same faces, but now arrow direction is the task, and eye gaze direction is irrelevant ((left/right; congruent; incongruent). We consider both strong and weak forms of an automatic processing account for the determination of eye gaze direction, both (iii) for manual responses and (iv) for ideo-motor compatible responses. The results are not in accord with what people say about (v) the dimensional salience of our stimuli, and nor are they congruent with what they (and presumably people in general) think (vi) the data pattern will look like. Implications for an automatic processing account are noted. Email: Derek Besner, dbesner@uwaterloo.ca

. Derek Desner, abesner@awater100.ea

4:50-5:05 PM (119)

A Computational Theory of Intention Selection. SØREN KYLLINGSBÆK, FRANZISKA OREN, and THOR GRÜNBAUM, University of Copenhagen - Humans have the capacity for intentional action, and we can form intentions by making a decision about what to do. Often time will elapse between forming an intention to do something and carrying out the intention. Not only do we have the capacity to set our own goals, we also have the capacity to delay the execution of our intentions and the ability to pursue long-term goals. These capacities are crucial to the set of abilities that make intentional action possible. At any one time, many intentions are represented in long-term memory and many of these may be relevant in the current context. Therefore, successful control of action by decision-making requires a solution to the computational problem of how the right intention is selected, out of a multitude of intentions, for execution at the right time. We propose a Computational Theory of Intention Selection (CTIS) of how standing intentions are selected from long-term memory, transformed into occurrent intentions in working memory, and finally lead to the execution of relevant actions. We show that the CTIS is able to model data from a new experimental paradigm that investigates selection of competing intentions over time.

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5:10-5:25 PM (120)

A Cognitive Model of Failing to Respond. ANDREW HEATHCOTE, University of Tasmania, KARLYE DAMASO, University of Newcastle, SPENCER C. CASTRO, University of Utah, DAVID L. STRAYER, University of Utah - Evidence accumulation models have been highly successful at explaining most aspects of simple and choice task, including accuracy the distribution response times (RT). However, sometimes participants fail to respond. Such response omissions are usually attributed to contaminating processes extraneous to the main task and ignored by cognitive models. However, experimental manipulations can sometimes have related effects accuracy or RT and omission rates suggesting they are influenced by common causes. We study such cases in simple and choice RT paradigms and propose a model of the common causes based on trial-to-trial variability in rates of evidence accumulation. We show this theory provides a good account of the observed data but can also require that some omissions are explained through a contaminant mechanism.

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Recall II

520 A, Friday Afternoon, 3:50-5:30 PM Chaired by Christoph T. Weidemann, Swansea University

3:50-4:05 PM (121)

Neural Measures of Subsequent Memory Reflect Endogenous Variability in Cognitive Function. CHRISTOPH T. WEIDEMANN, Swansea University, MICHAEL J. KAHANA, University of Pennsylvania - Humans cognition exhibits a striking degree of variability: Sometimes we rapidly forge new associations whereas at others new information simply does not stick. Although strong correlations between neural activity during encoding and subsequent retrieval performance have implicated such "subsequent memory effects" (SMEs) as important for understanding the neural basis of memory formation, uncontrolled variability in external factors that also predict memory performance confounds the interpretation of these effects. By controlling for a comprehensive set of external variables, we investigated the extent to which neural correlates of successful memory encoding reflect variability in endogenous brain states. We show that external variables that reliably predict memory performance have only minimal effects on electroencephalographic (EEG) correlates of successful memory encoding. Instead, the brain activity that is diagnostic of successful encoding primarily reflects fluctuations in endogenous neural activity. These findings link neural activity during learning to endogenous states that drive variability in human cognition.

Email: Christoph T. Weidemann, ctw@cogsci.info

4:10-4:25 PM (122)

Intentional Forgetting in the Social Domain: How Forgetting Affects Impressions and Attitudes We Form About Others. ALMUT HUPBACH and IIONA D. SCULLY, *Lehigh University* – In two studies, we assessed how the instruction to forget affects (a) memory for behaviors, (b) endorsement of traits that could be inferred from behaviors, and (c) attitudes about the individuals associated with the behaviors. In Study 1, participants were cued to selectively forget or remember several face-behavior pairs. In a memory test, fewer forget- than remember-cued behaviors were recalled. However, there was no effect on inferred traits, demonstrating that first impressions prevail even when specific behaviors are forgotten. In Study 2, participants learned about several negative behaviors of a person and were instructed to forget or to remember these before they learned neutral behaviors of a second person. In a delayed but not an immediate test, the forget group recalled fewer Person 1 behaviors and judged Person 1 less negatively than the remember group. This shows that attitudes can be affected by intentional forgetting, particularly after time has passed.

Email: Almut Hupbach, hupbach@lehigh.edu

4:30-4:45 PM (123)

Right, but Not the Left Prefrontal Cortex is Necessary for the Suppression of Unwanted Memories. MICHAEL C. ANDERSON Q, University of Cambridge, SHANTI SHANKER, Bournemouth University, OLIVER TURNBULL, Bangor University, BERIT BRUMERLOH, Universität Leipzig, JONATHAN FAWCETT, Memorial University of Newfoundland (Presented by Michael Anderson) - When people confront reminders to an experience they would rather not think about, they often try to stop the episodic retrieval process to prevent the unwanted memory from coming to mind. This process is known as retrieval suppression. Prior behavioral and imaging research suggests that retrieval suppression is achieved in part by an inhibitory control mechanism that suppresses the target memory, leading to suppression-induced forgetting, and that interactions between the right prefrontal cortex (PFC) and the hippocampus underlie this mechanism. It is unknown, however, whether the right PFC is causally necessary for retrieval stopping. Here we studied retrieval suppression using an adapted Think/No-Think task in 50 patients with damage to the PFC (25 with left-sided lesions, 25 right). Strikingly, whereas left PFC damage had little effect on suppressioninduced forgetting, damage to the right PFC fully abolished it. A second experiment using item-method directed forgetting revealed deficits in forgetting with right PFC lesions. These findings suggest that suppression-induced forgetting and item method directed forgetting may share inhibitory processes and that right PFC is causally necessary for motivated forgetting. Email: Michael C. Anderson, michael.anderson@mrc-cbu.cam. ac.uk

4:50-5:05 PM (124)

Block Order Can Eliminate Lexical/Long-Term Memory Effects in Reconstruction of Order but Not Serial Recall Tests. IAN NEATH, *Memorial University of Newfoundland*, PHILIP T. QUINLAN, *University of York*, AIMÉE M. SURPRENANT, *Memorial University of Newfoundland* – High frequency words are better recalled than low frequency words in immediate serial recall and reconstruction of order tests in within-subject designs when the two types of lists are randomly intermixed, and in between-subject designs when all lists contain only a single type of item. Similar results are found for other lexical/ long-term memory variables (e.g., concrete vs. abstract words, large vs. small orthographic neighbourhood words). We report a series of experiments in which we manipulate the order in which different types of items are seen in each block. For reconstruction of order tests, when the first half of the experiment has lists with only "easy" items (e.g., only high frequency or only concrete words), and the second half of the experiment has lists with only "difficult" items (e.g., only low frequency or only abstract words), the effects are abolished. However, when the opposite occurs -- the "difficult" item lists are in the first half and the "easy" item lists are in the second half -- the effects are observed. In contrast, for serial recall tests, the effects are always observed regardless of the block order. We discuss two different accounts: (1) the Item-Order Framework, and (2) a metacognitive explanation. Email: Ian Neath, ineath@mun.ca

5:10-5:25 PM (125)

Serial Order in Perception, Memory, and Action. GORDON D. LOGAN, Vanderbilt University - Serial order is important in perception, memory, and action but it is usually studied by different investigators using different tasks and different models. I will present results on serial order in perceptual whole report tasks that require ordered report of strings of 5-7 letters presented for 100 ms, serial memory tasks that require delayed ordered recall of 5-7 letter strings presented for 1000 ms and typing tasks that require copying continuously visible 5-7 letter strings. My main question is whether the same serial order process applies to all three tasks: do the same patterns of data appear in all three tasks? The observed patterns are similar but not identical, so I used computational models of perceptual encoding and serial retrieval to determine whether the similar effects were produced by the same mechanism, adapting Logan's (2018) context retrieval and updating model. Results from 24 subjects indicate that a model that allows perceptual confusions and contextual memory confusions to vary between tasks accounts for the data best. The modeling results suggest a single model may account for serial order in perception, memory and action and encourage the development of alternative models to test the idea more rigorously.

Email: Gordon D. Logan, gordon.logan@vanderbilt.edu

Bilingual Comprehension 519 B, Friday Afternoon, 3:50-5:30 PM

Chaired by Bernhard Angele, Bournemouth University

3:50-4:05 PM (126)

How Do Trilingual Readers Process Cognates and False Friends? BERNHARD ANGELE, Bournemouth University, PÂMELA FREITAS PEREIRA TOASSI, Federal University of Ceará, TIMOTHY J. SLATTERY, Bournemouth University, ELISÂNGELA NOGUEIRA TEIXEIRA, Federal University of Ceará (Presented by Bernhard Angele) – There is ample evidence that multilinguals process cognates faster than non-cognates (Lemhöfer, Dijkstra, & Michel, 2004). However, it is not clear whether this facilitation effect is due to orthographic similarity or due to the semantic overlap between the representations of the cognate in each language (or both). In an eye-tracking experiment, we asked Brazilian Portuguese/Spanish/English multilinguals of different proficiency levels to read English sentences containing cognates (e.g. *error*), "false friends" which appear to be cognates but have a different meaning (e.g. EN *exit* and PT/ES *éxito/éxito*, meaning *success*), and non-cognate control words. We found that participants made shorter fixations on the target word when it was either a cognate or a false cognate compared to the non-cognate control. In early measures, there was no significant difference between cognates and false friends in early measures (first fixation duration), but in later measures, cognates provided a greater benefit than false cognates, indicating that readers were sensitive to the semantic mismatch. For participants who were very proficient in Spanish, the difference between cognates and false cognates was already present in first fixation duration.

Email: Bernhard Angele, bangele@bournemouth.ac.uk

4:10-4:25 PM (127)

Does the Language Heard Elicit an Automatic Tendency to Switch to the Same Language in Production? AURELIU LAVRIC and BRONTË GRAHAM, University of Exeter - A view that is gaining ground in the literature on bilingual control is that real-life language switching may often not require effortful control, because one can rely on environmental cues to select the context-relevant language exogenously ("automatically"). One likely candidate for such an environmental cue is the language spoken by the interlocutor - it may elicit an involuntary tendency to switch to the same language. In three languageswitching experiments on two bilingual groups (Mandarin-English and French-English) one of several auditory cues (each heard in L1 or L2) specified which language to use for picture naming. Participants were required to select the language for speech based on the cue's meaning, which was emblematic of either the L1 culture or the L2 culture (e.g., "Great Wall" specified naming in Mandarin), irrespectively of the language of the cue. If the effect of the language heard on production is automatic (involuntary), it should facilitate a switch even when the language of the cue is not informative. We found little/ no evidence of such a bottom-up effect - the switch cost was not smaller when the language of the cue was the same as the language used for production than when they were different. Email: Aureliu Lavric, a.lavric@exeter.ac.uk

4:30-4:45 PM (128)

Testing the Inference Mediation Hypothesis in the Context of Different Literacy Tasks. JOSEPH P. MAGLIANO, Georgia State University, KARYN HIGGS, ALECIA SANTUZZI, and STEPHEN TONKS, Northern Illinois University, DANIEL P. FELLER, Georgia State University, RYAN KOPATICH, Northern Illinois University - The inference mediation hypothesis assumes that individual difference factors that affect reading proficiency have direct and indirect effects on comprehension outcomes, with the indirect effects involving inference processes. The present study tested the inference mediation hypothesis in a diverse sample of two and fouryear college students, and specifically in a task that emphasizes comprehension of the passage (traditional assessment) and a task that emphasizes complex problem solving (scenario-based assessment). Participant were administered assessments of foundational skills that support reading, inference generation,

a traditional assessment of comprehension proficiency and a scenario-based assessment. The results support the inference mediation hypothesis. Coherence building inferences partially mediated the relationship for the traditional measure, but not the scenario-based assessment. Elaborative inferences partially mediated the relationship for scenario-based assessment, but not the traditional measure. The results will be discussed in terms of a theory of task-oriented reading.

Email: Joseph P. Magliano, jmagliano@gsu.edu

4:50-5:05 PM (129)

Effects of Cross-Language Non-Selectivity are Eliminated in Biasing Discourse Contexts. ANA I. SCHWARTZ and KARLA S. TARIN, University of Texas, El Paso - We test whether local (sentence) and global (topic sentence) semantic bias modulate cognate status effects during comprehension of written paragraphs in an eye-tracking study. Highly proficient, Spanish-English bilinguals read all-English paragraphs. Four paragraph contexts for each critical cognate and noncognate control word were created such that the topic sentence was either related or unrelated in meaning to critical words and the initial portion of the second sentence containing the critical word either strongly or weakly biased its meaning. Linear Mixed Effect modeling revealed a 4-way interaction between global and local bias, cognate status and Spanish proficiency in was observed in GD and TRT. This interaction reflected the fact that, when global bias was neutral and local context biasing, there was an inhibitory effect of cognate status. This suggests that local bias produced strong activation of cognate representations across languages, resulting in competition between distinct orthographic forms. Effects of cognate status were eliminated in global-biased/local-biased contexts. Implications for current theories of the bilingual lexicon and non-selectivity will be discussed.

Email: Ana I. Schwartz, aischwartz@utep.edu

5:10-5:25 PM (130)

Reaching Native Fluency in Reading: An Eye-Tracking Corpus of Non-Native Readers of English. VICTOR KUPERMAN and KELLY NISBET, McMaster University, NOAM SIEGELMAN, Haskins Laboratories - Three major factors are identified as decisive in predicting reading comprehension and fluency in a non-native language: L1 proficiency, L2 proficiency, and distance between L1 and L2 languages and scripts. The Multilingual Eyemovement COrpus (MECO) collects eye-tracking and reading comprehension data from a variety of highly diverse languages and scripts (currently, Arabic, Finnish, German, Hebrew, Russian, and Turkish, and English as control). At each testing site, university students read the same set of expository English texts and answered comprehension questions taken from a college assessment of reading comprehension. All participants underwent a series of proficiency tests in their L1, as well as a fixed set of tests of English proficiency: vocabulary size, word and non-word reading, spelling, and others. We used regression models for prediction to evaluate (i) the systemic penalty to fluency and comprehension that the L1-L2 distance engenders; and (ii) how closely speakers of a specific L2 can approach native-like fluency if their proficiency in L2 component skills of reading is optimal. This approach enables identification of skills that grant the most benefit to a specific L2 population reading in English.

Email: Victor Kuperman, vickup@mcmaster.ca

Human Learning and Instruction I 519 B, Saturday Morning, 8:00-10:00 AM

Chaired by Andrew C. Butler, Washington University in St. Louis

8:00-8:15 AM (131)

Analyzing the Language Used in Course Syllabi and Its Relationship with Educational Practice. ANDREW C. BUTLER, Washington University in Saint Louis, NATHANIEL R. WOODWARD, University of Texas, Austin - The words that people use provide valuable insights into how they think. Given that the syllabus is a primary vehicle for communicating the plan for a course to students, the language instructors use in their syllabi may reveal their beliefs about teaching and learning. We investigated the language that instructors used in syllabi from over 1,000 high-enrollment undergraduate courses at a large public institution over a 5-year period and how the language relates to the educational practices employed in the course. Syllabi were processed using Linguistic Inquiry and Word Count software and coded for a variety of features (e.g., learning objectives, pedagogical techniques, assessment schemes). The results show that the language in course syllabi is generally quite formal, complex, and somewhat cold in emotional tone; however, there was interesting variation in language use across academic disciplines. In addition, some patterns emerged with respect to the relationship between language use and educational practices.

Email: Andrew C. Butler, andrew.butler@wustl.edu

8:20-8:35 AM (132)

Why Does Peer Instruction Help? JONATHAN G. TULLIS, University of Arizona, ROBERT GOLDSTONE, Indiana University - In peer instruction, instructors pose a challenging question to students, students answer the question individually, students discuss their answers with a peer, and finally students answer the question again. A large body of evidence shows benefits to student learning outcomes due to peer instruction. To determine the mechanism for these benefits, we collected semester-long data from six classes, involving a total of 208 undergraduate students being asked a total of 86 different questions related to their course content. For each question, students chose their answer individually, reported their confidence, reported their partner's answer and confidence, discussed their answers with their partner, and then indicated their possibly revised answer and confidence again. Overall, students were more accurate and confident after discussion than before. Initially correct students were more likely to keep their answers than initially incorrect students, and this tendency was partially but not completely attributable to differences in confidence. We discuss the benefits of peer instruction in terms of differences in the coherence of explanations, social learning, and the contextual factors that influence confidence and accuracy.

Email: Jonathan Tullis, tullis@email.arizona.edu

8:40-8:55 AM (133)

True-False Testing on Trial: Can Such Tests Elicit Productive Retrieval Processes? ROBERT A. BJORK, JORDAN A. BRABEC, STEVEN C. PAN, and ELIZABETH LIGON BJORK, University of California, Los Angeles (Presented by Robert Bjork) - Testing that elicits retrieval processes has been shown to function as a powerful learning event. But what about true-false testing, which is often disparaged as a form of testing? In three experiments, we examined whether true-false items elicit retrieval processes and, if so, whether the retrieval processes elicited by true items differ from those elicited by false items. Experiment 1 demonstrated that the evaluation of true items seems to enhance the learning of tested (but not related) information, whereas the evaluation of false items seems to enhance the learning of related (but not tested) information. This pattern proved robust to variations of syntactic sequence in Experiment 2 but was altered in Experiment 3 with the inclusion of parenthetical, dissociative clauses (e.g., "Castle Geyser (not Steamboat Geyser) is the tallest geyser."). This adjustment facilitated the learning of both tested and related information, regardless of whether the practice items were true or false. Overall, the present results reveal that true-false tests can have more pedagogical utility than previously assumed and, hence, might not be as guilty as previously charged. Email: Jordan A. Brabec, jbrabec@g.ucla.edu

9:00-9:15 AM (134)

Memory Benefits of Guessing with Delayed Feedback. KATARZYNA ZAWADZKA, OLIWIA ZABOROWSKA, EWA BUTOWSKA, KRZYSZTOF PIĄTKOWSKI, and MACIEJ HANCZAKOWSKI, SWPS University - Attempting to guess an answer to a question before being presented with the right answer has been shown to be benefit learning. However, the benefits of guessing are more readily obtainable when feedback is delivered immediately after guessing rather than after a delay. Even though the benefits of guessing with delayed feedback can be found for materials rich in meaning such as trivia questions, they are absent with more impoverished materials such as related word pairs. One reason for this could be that with less contextrich materials it might no longer be possible to remember the guessing stage and thus benefit from the semantic processing occurring at that time. We thus set out to create conditions that would remind participants of their guesses by manipulating the contextual match between guessing and feedback presentation. When the same contexts were used at both times, guessing benefitted memory for related word pairs even when feedback was delayed.

Email: Katarzyna Zawadzka, k.n.zawadzka@gmail.com

9:20-9:35 AM (135)

Sleep and STEM Learning: Influences on Meta-Cognition and Memory Consolidation. MICHAEL K. SCULLIN, CHENLU GAO, and ANNIE GINTY, *Baylor University* – More than 50% of college students are habitually sleep deprived, yet it is unknown whether—and how—such prolific sleep loss impedes STEM success. In Experiment 1, 100 undergraduate students were randomly assigned to sleep normally (7-8 hours) or restrict their sleep (6 hours) prior to taking a virtual lecture on organic chemistry. Meta-cognitive predictions were wellcalibrated to test performance after normal sleep (56% versus 63%, p>.05), but miscalibrated after sleep restriction (46% versus 67%, p<.001). In Experiment 2, 50 undergraduate students listened to classical music while taking a virtual lecture, and when they entered polysomnography-defined slow-wave sleep, we randomly assigned them to targeted memory reactivation (classical music replay) or control conditions (white noise), using double-blinded methodology. Replaying the classical music during slow wave sleep spurred additional memory consolidation, evidenced by significantly better performance on the morning test (64% versus 48%, p<.05). Thus, sleep may contribute to STEM persistence and achievement via altering meta-cognitive expectations and reducing memory consolidation.

Email: Michael Scullin, Michael_Scullin@baylor.edu

9:40-9:55 AM (136)

Applying Learning Science to Improve Transfer in Introductory Statistics. ADAM B. BLAKE and LAURA C. FRIES, University of California, Los Angeles, JI Y. SON, California State University, Los Angeles, JAMES W. STIGLER, University of California, Los Angeles - Introductory statistics should build knowledge that transfers to a richer understanding of statistics. Many students fail to realize the importance of variability in hypothesis testing after a formal course (Son et al., 2016), which may be due to emphasis on individual concepts (e.g., t-test, binomial distribution) rather than a coherent organization of the domain. In an interactive online textbook (Son & Stigler, 2019), 1200+ embedded exercises help students practice connecting abstract core concepts (e.g., GLM, sampling distributions) and representations (e.g., notation, plots, R code) to model the data generating process. After a 10-week course, 258 students (repl. with 200) transferred their learning to multiple regression, which was not taught. The majority of students correctly extended GLM notation (78%) and made correct predictions about R^2 (83%), SST (78%), and SSE (85%). They had difficulty interpreting coefficients (44%). These patterns indicate understanding of statistical modelling that transfers to complex models with almost no further instruction. This kind of long-term learning is ostensibly the goal of instruction, but hard to study in the lab; our development of a new model of educational research is discussed.

Email: Adam B. Blake, adamblake@g.ucla.edu

Divided Attention 520 A, Saturday Morning, 8:00-10:00 AM Chaired by Trafton Drew, University of Utah

8:00-8:15 AM (137)

Telephone Interruptions Lead to Uniquely Prolonged Cognitive Impairment. TRAFTON DREW, DAVID ALONSO, SUMMER VAZQUEZ, AYDIN TASEVAC, and LAUREN H. WILLIAMS, *University of Utah* (Presented by Trafton Drew) – In driving research, a Detection Response Task (DRT) has demonstrated that people experience prolonged cognitive impairment following an interruption (Strayer et al., 2017). Interruptions in the radiology reading room are a common occurrence. The current experiments aimed to examine potential effects on radiologists by determining if telephone interruptions during a challenging visual search task would also lead to prolonged cognitive impairment. In three experiments, participants searched for targets amongst a large array of distractors. In Experiments 1 & 2, we varied difficulty of the interruption task and found that both interruptions led to ~30s of cognitive impairment, much longer than the costs observed in the driving literature. Experiment 3 replaced the telephone interruption with a matched interruption initiated on the search screen. Here, we observed greatly reduced interruption costs. This suggests that telephone interruptions are uniquely disruptive, leading to prolonged cognitive impairment. These results have important implications for optimizing radiology reading room environments and improving patient outcomes. Email: Trafton Drew, trafton.drew@psych.utah.edu

8:20-8:35 AM (138)

Examining the Spread of (In)attentiveness in the Classroom. NOAH D. FORRIN, ALEX C. HUYNH, ALYSSA C. SMITH, EMILY N. CYR, DAVID MCLEAN, JAMES SIKLOS-WHILLANS, EVAN F. RISKO, DANIEL SMILEK, and COLIN M. MACLEOD, University of Waterloo - Attention contagionthe spread of attention in groups-may be particularly prevalent in undergraduate lectures, where attentive (e.g., notetaking) and inattentive (e.g., phone-checking) behaviors can spread between students. In our simulated classroom, pairs of undergraduate students watched a lecture video (on the history of Pompeii). Each pair consisted of one participant (n = 187) and one confederate. The confederate behaved either attentively (e.g., leaning forward, taking notes frequently) or inattentively (e.g., slouching, taking notes infrequently). Across multiple measures, we found support for our attention contagion account: Relative to participants who watched the lecture with an inattentive confederate, participants with an attentive confederate: i) took significantly more lecture notes, ii) self-reported being "on task" significantly more often, and iii) performed significantly better on a multiple-choice test of lecture content. Broadly, student (in)attentiveness influences the attentiveness (and learning) of classmates. Email: Noah Forrin, nforrin@gmail.com

8:40-8:55 AM (139)

Investigating Dual-Task Interference in Children Versus Young Adults with the Overlapping Task Paradigm. TILO STROBACH, Medical School Hamburg, JULIA KARBACH, University of Koblenz-Landau - Performing two tasks simultaneously in dual-task situations leads to increased processing times and/ or error rates compared to single tasks with separate task performance (i.e., dual-task costs). Previous studies demonstrated that these dual-task costs are even higher in children than in young adults. However, these studies did not specify the mechanisms explaining these higher dual-task costs and did not assess the specific task processes that particularly interfere simultaneous task performance in children. To assess this interference in children (N = 30) and young adults (N = 30), we combined sensorimotor tasks in dual tasks of the psychological refractory period (PRP) type and compared age-related differences in interference at perceptual, responseselection, and motor processes. The results provided evidence

for interference at response-selection processes in both age groups and indications for additional perceptual interference in children. We discuss the data in the context of the locus-ofslack logic.

Email: Tilo Strobach, tilo.strobach@medicalschool-hamburg. de

9:00-9:15 AM (140)

The Cost and Benefit of Presenting a Visual-Spatial Cue on the Dual Task Interference. MARYAM KAVYANI and ALIREZA FARSI, Shahid Beheshti University - When two distinct stimulus presented at the rapid succession, the response times on the second task become increasingly long as the stimulus onset asynchrony decreases. Also, if a visual cue presented before a target, there is an inhibitory after effect called inhibition of return. The present study examined whether the inhibitory aftereffect of the cue would interact with the psychology refractory period. A modified psychological refractory period paradigm was incorporated in which a cue was presented before the first stimulus. Each dual-task trial began with a visual cue. The first task was a two-alternative forced localization visual task, where participants were required to ignore the cue and to indicate whether the first stimulus had been presented at the left or right. Task 2 required a detection task. The cue to target time interval was 500 ms and the time interval between the first and second target (TTOA) was 400 or 800 ms. Results showed, a significant main effect of TTOA and cueing on RT2; as TTOA increased, RT2 decreased and RT2s being slower overall to the cued location. Thus, the inhibitory effect as a consequence of orienting can lead to decrease the central interference in dual task performance.

Email: Maryam Kavyani, ma_kavyani@sbu.ac.ir

9:20-9:35 AM (141)

The Asymmetric Mixed-Category Advantage in Visual Working Memory: An Attentional, Not Perceptual (Face-Specific) Account. NURIT GRONAU and ROTEM AVITAL-COHEN, The Open University of Israel - The mixed-category advantage in visual working memory refers to improved memory for an image in a display containing two different categories relative to a display containing only one category (Cohen et al., 2014). Jiang et al. (2016) found that this advantage characterizes mainly faces and suggested that face-only displays suffer from enhanced interference due to the unique configural nature of faces. Faces, however, possess social and emotional significance that may bias attention toward them in mixedcategory displays at the expense of their counterpart category. Consequently, the counterpart category may suffer from little/no advantage, or even an inversed effect. Using a change-detection task, we showed that a category that demonstrated a mixedcategory disadvantage when paired with faces, demonstrated a mixed-category advantage when paired with other non-facial categories. Furthermore, manipulating the likelihood of testing a specific category (i.e., increasing its relevance to the task) in mixed-category trials altered its advantaged/disadvantaged status, suggesting that the effect may be mediated by attentional allocation. Email:

9:40-9:55 AM (142)

On the Potential for Wearable Technology in the Modeling of Vigilance and Fatigue for Aeronautic Applications. RAYMOND M. KLEIN and BRETT B.T. FELTMATE, Dalhousie University, AUSTIN HURST, University of Waterloo, MAELLE KOPF and JEAN-FRANCOIS GAGNON, Thales Recherche et Technologie (TRT) - Fatigue-related decreases in vigilance (hypovigilance) and their negative effects on performance have been widely recognized as posing a serious risk to aviation safety. To develop a model for online detection of hypovigilance, a study was carried out in wherein 22 participants performed tasks over two 8-hour periods. A variety of physiological (cardiorespiratory, oculomotor) and performance parameters were collected during each session. Fatigue-related-vigilance was assessed through self-reports, a psychomotor vigilance task (PVT, regularly throughout the data collection), and a modified attention network test (ANT-IVea) that was administered at the beginning and end of each 8-hour session). A decision tree-based ensemble classifier was trained using a "leave-one-participant-out" crossvalidation scheme to classify fatigue-related hypovigilance with physiological parameters. Results showed that the accuracy on left out participants reached 72% on average, highlighting key physiological parameters associated with hypovigilance across individuals. Results are discussed regarding how this model could be used for triggering online mitigation of hypovigilance and improve performance on realistic piloting tasks. Email: Raymond M. Klein, ray.klein@dal.ca

Judgment and Decision Making I 520 C, Saturday Morning, 8:00-10:00 AM Chaired by Ami Eidels, University of Newcastle

8:00-8:15 AM (143)

Competitive Decision Making in Dutch Auctions. AMI EIDELS, RACHEL MULLARD, JONATHON LOVE, and MARC ADAM, University of Newcastle - In a Dutch Auction an item if offered for sale at a set maximum price. The price is then gradually lowered over a fixed amount of time until a bidder makes a bid, at which point that bidder is guaranteed the purchase, at the current price. Bidders must consider ('tradeoff') certainty and price: bid early and you secure the item but pay a premium; bid later and the price is lower but you risk losing the bid to another. These properties make Dutch Auction a fascinating context for the study of competitive decision making. We conducted a set of experiments in which triplets of participants took part in a computerised Dutch Auction, playing against each other in various conditions. In another experiment, the same participants played individually against a computer opponent. I shall present our computerised platform and preliminary results, including the effects of price-step and price volatility on bidding behaviour.

Email: Ami Eidels, ami.eidels@newcastle.edu.au

8:20-8:35 AM (144)

Using Reverse Contests to Curb Polluting Activity. YAAKOV KAREEV and JUDITH AVRAHAMI, *The Hebrew University of Jerusalem*, DAVID V. BUDESCU, *Fordham University* – Agents engaging in polluting production commonly stand to profit more, the more they produce. Regulators face the challenge of curbing pollution, without eliminating the incentives to produce. We propose a reversed contest as a method to reduce production. In regular contests, agents bear costs in order to win the prize awarded to the highest investor; in our reverse contest agents invest in production, for profit, but attempt to avoid the fine imposed on the highest investor. In regular contests the participants tend to over-invest because of the uncertainty and the motivation to win. We hypothesize that in the reverse contest the same principles will drive people to under-invest. In two experiments, in which agents differed either in their budgets (Exp. 1) or in their efficiency (Exp. 2), investments were markedly lower than the maximum (although higher than the game-theoretic prediction). The results demonstrate the potential of reverse contests for curbing polluting production. Email: Yaakov Kareev, yaakov.kareev@mail.huji.ac.il

8:40-8:55 AM (145)

The Wisdom of Model Crowds. LISHENG HE, University of Pennsylvania, PANTELIS PIPERGIAS ANALYTIS, University of Southern Denmark, SUDEEP BHATIA, University of Pennsylvania - Over the last few decades, dozens of cognitive and psychological models have been advanced to account for human risky decision making. However, there is little consensus regarding which of these models offers the best account of behavior, and it is unclear how we can combine these models to obtain novel descriptive and predictive insights. In this paper we offer two solutions to this issue. First, we conduct a largescale comparison of 58 prominent models of risky choice, using sixteen existing datasets consisting of 720 participants. This allows us to comprehensively evaluate numerous models in terms of their performance on the individual level across a range of different experimental designs. Second, we show that each of the existing models can be seen as an "expert", which provides a unique opinion in an out-of-sample choice prediction problem, and that the crowds of risky choice models can perform better than individual models alone. Our results suggest that different choice models may capture different aspects of the decision process and the numerous existing models can be seen as offering complementary rather than competing accounts of individual choice behavior.

Email: Lisheng He, hlisheng@sas.upenn.edu

9:00-9:15 AM (146)

Does a Cognitive Load Increase Baserate Neglect? And Does It Look Like Group Decision Making? VERLIN B. HINSZ and ANNA M. SEMANKO, *North Dakota State University* – Research indicates that individuals tend to neglect baserate information and that groups tend to exaggerate this baserate neglect. We hypothesized that being in a group may place members under cognitive load and thus group responses should resemble individual responses if they experience a cognitive load. With five different baserate problems, we demonstrated that individuals under a cognitive load (remembering 2, 3, or 4 characters while reading and responding to a baserate problem) did succumb to baserate neglect and that groups exaggerated this tendency. The three cognitive load conditions also showed that the higher levels of load led to an enhanced pattern of

baserate neglect; however, that pattern did not resemble that of the group responses to the baserate problems. Consequently, cognitive load is found to impact the tendency to neglect base rate information, but inconsistent with our hypothesis, the pattern is different from that of group baserate responses. Email: Verlin Hinsz, Verlin.Hinsz@ndsu.edu

9:20-9:35 AM (147)

Sunk-Cost Effect From 3 to 97 Years of Age. DANIEL M. BERNSTEIN and ZACHARIAH I. HAMZAGIC, Kwantlen Polytechnic University, ERIC Y. MAH, University of Victoria, DANIEL G. DERKSEN, Simon Fraser University - The sunk-cost effect (SCE) is the tendency to continue an unsuccessful activity after devoting resources to it. Prior work has shown larger SCEs in children and smaller SCEs in older adults compared to younger adults; however, these studies used different measures to assess the SCE in children and adults. In two cross-sectional studies (N = 774) all participants evaluated the same vignettes and rated how likely a character would be to continue an activity. In one vignette, participants rated both how much bad pizza a character would eat after (1) baking it herself and (2) receiving it from a neighbor. As expected, participants overall showed a robust SCE by claiming that the character would eat more bad pizza after baking it herself. Unlike prior studies, we found that the SCE was absent in young childhood, emerged in late adolescence and increased into older adulthood. Email: Daniel Bernstein, dbernste@kpu.ca

9:40-9:55 AM (148)

Do Low Probabilities Indicate Large Gains and Small Losses Indicate High Probabilities? An Examination of Risk-Reward Heuristics Under Gain and Loss Situations. KUNINORI NAKAMURA, Seijo University - Utility and probability have been considered as independent constructs for judgment under uncertainty. However, many studies have suggested that people assume a correlation between the two. Some studies have demonstrated that people estimate the utility of events depending on their probabilities, and others have indicated an existence of "risk-reward heuristics" that assume a negative correlation between probability and utility when inferring winning probabilities of payoffs during decision under uncertainty. This study aimed to explore this probabilityutility correlation by requiring participants to estimate both probabilities from payoffs and payoffs from probabilities under gain or loss situations. Results indicated that when estimating values of payoffs from probabilities, participants' judgments showed clear negative probability-utility correlations both in gain and loss situations. However, when estimating probabilities from payoffs, this negative probability-utility correlation was found only in gain situations. These results support the existence of risk-reward heuristics and suggest the possibility that people have different perceptions of the probability-utility relationship between gain and loss domains.

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Letter/Word Processing I 520 B, Saturday Morning, 8:00-9:40 AM Chaired by Stephen J. Lupker, University of Western Ontario

8:00-8:15 AM (149)

Letter Position Coding Flexibility When Reading Logographic Scripts. STEPHEN J. LUPKER and HUILAN YANG, University of Western Ontario, YASUSHI HINO and MASAHIRO YOSHIHARA, Waseda University, MARIKO NAKAYAMA, Tokohu University, JUNYI XUE, Waseda University (Presented by Stephen Lupker) - Yang, Chen, Spinelli and Lupker (in press) reported a "backward" priming effect in Chinese using four-character words in a masked priming lexical decision task (LDT) (using an English example, ecaf primed FACE). The question is whether transposed character priming effects of this sort in Chinese are orthographic effects or whether they are either morphological or syllabic/phonological effects. Experiments 1 and 2, using a masked priming LDT, showed that syllabically related primes do not produce priming with our stimuli. Experiment 3, using a masked priming same-different task, produced a sizeable backward priming effect suggesting that these transposed character priming effects are most likely orthographically-based. Experiment 4 used Japanese Kanji and Katakana stimuli in a masked priming LDT. Transposed character priming effects were not larger for (logographic) Kanji targets (which share morphology with their primes) than for Katakana targets (which do not). These results support the idea that the backward priming effect in Chinese is, most likely, an orthographic rather than a morphological or syllabic effect and imply that logographic script readers have considerable flexibility in their character position coding process. Email: Huilan Yang, yhuilan@uwo.ca

8:20-8:35 AM (150)

WTF? Prime Case Effect with Abbreviations. SACHIKO KINOSHITA and DANIEL WHITING, Macquarie University - For word targets presented in uppercase letters (e.g., TABLE), priming effects of similar size are observed with identity primes presented in uppercase letters (TABLE), lowercase (table) and mixed case (e.g., tAbLe). This finding is typically taken as support for the "canonical view" of visual word recognition that the visual form of letters comprising the word is lost early in the mapping onto abstract letter representations (e.g., Marin & Davis, 2019). Here we consider an alternative explanation of the absence of prime case effect, that prime case does not modulate priming because it is not relevant to the lexical status of common words. We tested this idea using abbreviations (e.g., CIA, DNA) as a contrasting case, and found effects of prime case with these stimuli. Discrepant findings within and across different writing systems are also discussed.

Email: Sachiko Kinoshita, sachiko.kinoshita@mq.edu.au

8:40-8:55 AM (151)

The Auditory English Lexicon Project. WINSTON D. GOH, MELVIN J. YAP, and QIAN WEN CHEE, *National University of Singapore* – The Auditory English Lexicon Project (AELP) is a multi-talker, multi-region psycholinguistic database of 10,170 spoken words and 10,170 spoken nonwords. Six tokens of each stimulus were recorded as 44.1 kHz, 16-bit, mono WAV files by native speakers of American, British, and Singaporean English, with one from each gender. Identification norms, as determined by average intelligibility scores and confidence ratings from between 15 and 20 responses per token, were obtained from over 550 participants. Auditory lexical decision accuracies and latencies, with between 25 and 30 responses per token, were obtained from over 400 participants. The database also includes participants' individual difference measures such as age, gender, language background and proficiency, as well as a variety of lexico-semantic variables and structural indices for the words and nonwords. Taken together, there are a total of 122,040 sound files and over 4 million behavioural data points in the AELP. We describe some of the characteristics of this database. This resource is freely available from a website hosted by the Department of Psychology at the National University of Singapore.

Email: Winston D. Goh, psygohw@nus.edu.sg

9:00-9:15 AM (152)

Investigating Letter Perception with Fast Periodic Visual Stimulation: Beware of Hasty Conclusions. ALAIN CONTENT and FABIENNE CHETAIL, Université libre de Bruxelles - The use of fast periodic visual stimulation (FPVS) and steady state visual evoked potential (SSVEPs) to investigate language processing is increasingly attracting attention. Combined with an oddball paradigm, FPVS makes it possible to assess whether two categories of stimuli are discriminated without driving participants' attention towards the stimuli. Moreover, SSVEP analysis offers an excellent signal-to-noise ratio with a few minutes of stimulation. We present two studies using FPVS. One aimed at evaluating the discrimination of high- and low-frequency bigrams and the other, the discrimination of consonant vs. vowel letter categories. A series of experiments provided clear evidence in favor of bigram frequency discrimination, whereas the evidence for consonant/ vowel distinction remains uncertain. Moreover, in the course of these investigations, we identified two potential pitfalls that will be discussed. First, the repetition of standard and deviation exemplars in the stimulus series could induce implicit learning phenomena. Second, the quasi-periodicity of exemplars may be sufficient to create spectral components at the oddball frequency.

Email: Alain Content, alain.content@ulb.ac.be

9:20-9:35 AM (153)

Learning New Written Words in Adults: Investigation Using a Naturalistic Situation of Story Reading. FABIENNE CHETAIL and ANEZKA SMEJKALOVA, Université Libre de Bruxelles - LCLD – Encountering unknown words is a common experience of any adult reader. To be learnt and easily recognized later on, novel words need to enter the mental lexicon – a dedicated memory system providing information on the spelling, pronunciation, morpho-syntactic features, and meaning of words. Despite the ubiquity and efficiency of novel word learning, we are far from understanding the processes by which unfamiliar letter strings enter our mental lexical stock. The aim of the present study was to examine how reading experience impacts the contents and structure of lexical storage in adults. To do so, we used an original approach of novel word learning based on a naturalistic situation of story reading. We manipulated the number of occurrences of novel words and the ease of meaning inference. After reading, knowledge on phonology, orthography, and semantics of new words was assessed (with spelling, naming and word meaning recognition tasks respectively) as well as the integration of new words into the mental lexicon (primed lexicality effect). We found clear evidence of word feature learning but no hint of lexical integration.

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Individual Differences in Attention and Cognition 518 A, Saturday Morning, 8:00-9:40 AM

Chaired by Gene Brewer, Arizona State University

8:00-8:15 AM (154)

Individual Differences in Vigilance: Implications for Measuring Sustained Attention and its Association with Cognitive Abilities and Other Psychological Constructs. GENE BREWER and MATTHEW ROBISON, Arizona State University (Presented by Gene Brewer) - Sustaining attention is notoriously difficult. Typically, when people have to sustain their attention to a single task, their performance deteriorates across time. This phenomenon is usually referred to as the vigilance decrement. However, as with most phenomena, there are substantial individual differences in the extent of this effect. That is, some people show more pronounced vigilance decrements than others. Such individual differences can potentially be leveraged to understand the cognitive mechanisms underlying sustained attention. In the present study, we combine linear mixed effects modeling and latent variable analysis to assess individual differences in vigilance and their association with other relevant psychological constructs. We analyzed six published and unpublished datasets and compared findings across studies. These studies used various combinations of working memory, attention control, fluid intelligence, and vigilance tasks. We conclude that vigilance is indeed a trait-level cognitive ability that is meaningfully related to other cognitive abilities, distinguishable yet related to attention control as it is typically measured, and correlates with other state and trait variables.

Email: Gene Brewer, gene.brewer@asu.edu

8:20-8:35 AM (155)

Individual Differences in Updating are Not Related to Reasoning Ability. GIDON T. FRISCHKORN, University of Zurich, CLAUDIA VON BASITAN, University of Sheffield, ALESSANDRA S. SOUZA and KLAUS OBERAUER Q, University of Zurich – Updating is the executive function (EF) most consistently and strongly related to cognitive abilities such as reasoning. Whereas other EF factors (i.e., inhibition and shifting) are usually measured through difference scores that isolate the contribution of EF, updating has been assessed through overall accuracy in a working memory (WM) task involving updating. This updating accuracy-score conflates individual differences specific to updating processes (e.g., the removal of outdated information) with variance in general



WM maintenance. In a re-analysis of data from von Bastian, Souza, and Gade (2016), we separated variance specific to updating from that related to WM maintenance. Updatingspecific variance contributed only 20% to individual differences in overall performance, and it correlated neither with WM capacity nor reasoning. In contrast, general WM maintenance correlated with both abilities. These findings challenge the view that updating processes (and EFs more generally) contribute to cognitive abilities and call for the need to refine the measurement of updating.

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8:40-8:55 AM (156)

An Individual-Differences Look at Creative Cognition. ANDREW F. JAROSZ and SARAH K.C. DYGERT, Mississippi State University (Presented by Andrew Jarosz) - Creative thinking is generally studied using either divergent-thinking tasks or problem-solving tasks, though they are rarely examined concurrently. Combined with their prominence in different research traditions (the psychometric and cognitive psychology literatures, respectively), it is unclear whether these tasks measure the same construct or draw upon shared or independent processes. The present study examined these possibilities, using structural equation modeling to compare a series of theoretically driven models against each other. Results demonstrated that divergent thinking and creative problemsolving represent separable forms of creative thinking but share a common domain-general construct. Additionally, working memory predicted variance in domain-general creative thinking and domain-specific creative problem-solving, but not domain-specific divergent thinking. Finally, fluency of memory retrieval explained substantial variance, above and beyond working memory, in both types of domain-specific creative thinking. These results support a dual-process theory of creative thinking and highlight promising future directions in exploring the cognitive processes underlying creativity.

Email: Sarah K.C. Dygert, skc195@msstate.edu

9:00-9:15 AM (157)

Comparing Performance of Diffusion Models for the Simon Task. COREY N. WHITE, Missouri Western State University, MATHIEU SERVANT, Universite de Bourgogne Franche-Comte - The Simon task is commonly used to assess individual differences in executive function. The standard analysis involves computing a Simon Effect for each participant, calculated as the difference in mean RTs between congruent and incongruent conditions. However, recent work suggests that this measure of executive function is contaminated by extraneous factors like response caution. One way to circumvent this problem is to model Simon data with RT models like the drift-diffusion model. However, it is unclear which variant of the diffusion model is best for interpreting Simon data. We collected data from Simon tasks that manipulated stimulus discriminability, stimulus eccentricity, response caution, location bias, and response bias. These data were used to contrast two recent models for this task, the Diffusion Model for Conflict tasks and the Dual-Stage Two-Phase model of visual attention. Results will be discussed in terms of which model provides the most parsimonious account of the task manipulations, with a focus on how the preferred model can be used by researchers interested in individual differences in executive function. Email: Corey N. White, cwhite34@missouriwestern.edu

9:20-9:35 AM (158)

Perils of Using Psychology Subject Pools for Cognitive Psychology Research. STEPHEN R. MITROFF, COURTNEY L. PORFIDO, and PATRICK H. COX, George Washington University, STEPHEN H. ADAMO, University of Central Florida (Presented by Stephen Mitroff) - Many cognitive psychology laboratories recruit participants through department-run subject pools, wherein students participate in studies for course credit. Students gain firsthand research experience and researchers gain free access to participants. Critically, students self-select when they participate over the course of an academic term, with some choosing the start and some choosing the end. Previous studies from social psychology have shown that students who choose to participate early in the term score higher on measures of conscientiousness and neuroticism and differ from late participating students on various individual difference metrics. However, there are mixed findings on whether cognitive psychology research is impacted by time of participation. Here, a visual search task was run at the start and end of multiple terms with two early and two late cohorts. Early participants were more accurate at difficult searches, less likely to be outliers, more likely to arrive on time, and less likely to no-show. The findings suggest there are meaningful differences between results from experiments run at the beginning vs. end of a term that can impact both cognitive psychology research and practical aspects of conducting studies. Email: Stephen Mitroff, mitroff@gwu.edu

Concepts and Categories 520 F, Saturday Morning, 8:00-9:40 AM Chaired by Shane Mueller, Michigan Technological University

8:00-8:15 AM (159)

Evaluating a Computational Model of Sensemaking on the Berg Card-Sorting Task and the Weather Prediction Task. SHANE T. MUELLER, Michigan Technological University, ROBERT R. HOFFMAN, Institute for Human and Machine Cognition, GARY L. KLEIN, MacroCognition, LLC, LAMIA ALAM and TAUSEEF MAMUN, Michigan Technological University - Sensemaking entails a complementary set of processes by which we create, adapt, and tune our mental models of the environment in order to behave intelligently. Although studied directly in applied and naturalistic settings (e.g., business, naturalistic decision-making, and education), cognitive theorists have focused primarily on its component processes, such as category and function learning, causal reasoning, abductive inference, and choice. We describe a computational model theory of sensemaking based on the naturalistic Data/Frame theory that integrates many of the microcognitive processes into a formal theory of sensemaking. The theory involves: (1) a framing process through mental models are search, modified, and compared via mental simulation, and (2) a tuning process by which a given mental model is adapted through low-level reinforcement learning to account for the data. We examine the model on a variety of decision and learning tasks, including Berg's (Wisconsin) Card sort and the Weather Prediction Task.

Email: Shane T Mueller, shanem@mtu.edu

8:20-8:35 AM (160)

Comparing Exemplar and Prototype Models in a Natural-Science Category Domain. ROBERT NOSOFSKY and BRIAN MEAGHER, Indiana University Bloomington, CRAIG SANDERS, Vanderbilt University, PARHESH KUMAR, Indiana University Bloomington - A classic issue in the cognitive science of category learning has involved the contrast between exemplar and prototype models. However, experimental tests to distinguish the models have relied almost solely on use of artificial category structures composed of highly simplified stimuli. Here we aim to contrast the predictions from the models in a real-world, natural-science category domain geologic rock types. Using a set of complementary methods, including multidimensional scaling of similarity-judgment data, direct dimension ratings, and deep-learning technology, we first derive a high-dimensional feature space in which the rock stimuli are embedded. We then compare the categorylearning predictions of exemplar and prototype models that make reference to this feature space. The category-learning experiments involve conditions that should be favorable to processes of prototype abstraction, including use of large-size categories and delayed transfer testing. We will report the results of this currently ongoing research at the talk itself. Email: Robert Nosofsky, nosofsky@indiana.edu

8:40-8:55 AM (161)

Automatically Estimating Color-Concept Associations from Image Statistics and Category Extrapolation. KAREN B. SCHLOSS, RAGINI RATHORE, ZACHARY LEGGON, and LAURENT LESSARD, University of Wisconsin-Madison - In visual reasoning, people make conceptual inferences from visual input. These inferences enable interpretations of the world, from determining ripeness of fruit to understanding meanings of colors in data visualizations. Evidence suggests color inferences are computed from associations between colors and concepts, so studying how color inference works requires quantifying color-concept associations. One approach is to have humans make color-concept association ratings, but that can be costly or even intractable, depending on the number of colors and concepts. To mitigate this problem, we developed and assessed new methods for automatically estimating colorconcept associations from images. Our most effective method used features relevant to both perception and cognition: aligning with perceptual dimensions of color space and extrapolating within color categories. These results enabled an automatic estimation of color-concept associations that matched human judgments and led to a category extrapolation hypothesis for how people build color-concept associations from experiences in the world.

Email: Karen B. Schloss, kschloss@wisc.edu

9:00-9:15 AM (162)

Rethinking the Input: Skewed Distributions of Exemplars Result in Broad Generalization in Category Learning. CHEN YU, Indiana University, PAULO CARVALHO, Carnegie Mellon University, CHI-HSIN CHEN, Ohio State University Medical Center (Presented by Chen Yu) - What we learn about the world is affected by the input we receive. Recent corpus studies suggest that real-world category input tends to be organized around skewed distributions. The present paper examined the effects of skewed distributions on visual category learning. In the first study, egocentric video data collected from young children were used to train a convolutional neural network (CNN) to learn visual objects. We found that certain distributional properties in the child input (e.g. skewness and variability) facilitate visual object recognition in the model. In the second study, we conducted three experiments to examine the effects of skewed input distributions on category learning and generalization. Across all studies, skewed input distributions resulted in broader generalization than uniform and normal distributions. Our results challenge the current theories to explain category learning in the real world with skewed, instead of the normal or uniform distributions often used in experimental studies. Email: Chen Yu, chenyu@indiana.edu

9:20-9:35 AM (163)

The Facilitation of Cognitive Procedures is not Dependent on Maintenance of Declarative Memory Elements. CHRISTOPHER A. WAS, MICHAEL F.S. BARANSKI, TRISTAN A. COCHRAC, DANIEL P. BYRNES, and ERIN N. GRAHAM, Kent State University - research has demonstrated that the cognitive procedure of categorization can be facilitated with practice. That is, practice categorizing exemplars of a particular category results in faster and more accurate categorizing of new exemplars within processed categories compared to non-processed categories. Further, subsequent research using a directed-forgetting paradigm demonstrated that this facilitation of procedural memory can occur without the maintenance of declarative memory elements (i.e., category exemplars). The current research extends these findings by examining if procedural memory can be facilitated in the absence of declarative memory recall of processed category labels. Results demonstrate another replication of the facilitation of procedural memory as well as non-recalled category exemplars being categorized faster and more accurately than non-processed category exemplars. Interestingly, participants more quickly and accurately categorized non-recalled categories compared to recalled categories. The results suggest that the facilitation of exemplar comparisons is not dependent upon category label maintenance.

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Symposium III: Seeking Explicit Cognitive Processes in Animals

517 D, Saturday Morning, 10:00 AM-12:00 PM

Chaired by Barbara A. Church, Georgia State University; J. David Smith, Georgia State University

10:00-10:15 AM (164)

Animal Metacognition: The Dolphin's Tale. J. DAVID SMITH, Georgia State University - A bottlenose dolphin inaugurated the literature on animal metacognition. His "metacognitive" performance spurred a 20-year associative-metacognitive debate, considering whether associative-learning processes or explicit-decisional processes underlay his performance. Across many empirical contributions, associative explanations fell away, leaving behind the consensus that some species share some aspects of humans' metacognitive monitoring. This presentation will review the arduous progress of this area. But crucial questions remain. How can we positively identify explicit (meta)cognition in animals who cannot declare their mental states? What are the primary markers of explicit animal cognition, so that the explicit interpretation isn't just the residue remaining when all associative descriptions have faltered? I consider some answers to these questions. And I seek a sharper understanding of the construct of associative learning, so that behavioral scientists can more clearly differentiate and contrast animals' performances at implicit (associative, procedural) and explicit (controlled, decisional) levels.

10:20-10:35 AM (165)

Remembering What's Important: Evolution of Memory Prioritization. JOSEPH MANNS, Emory University - Across mammals, the hippocampus shows a degree of homology that suggests it conveyed a generalizable contribution to fitness throughout the diversification of the taxon. However, the type of everyday declarative memory supported by the hippocampus is fallible and typified more by forgetting than remembering. Good memory, in an evolutionary sense, is thus better characterized by prioritization of useful information rather than by total storage capacity. Metamemory processes, such as post-retrieval monitoring, are one important mechanism for shuffling ationable information o he op. Another important route to good memory is prioritization of encoding or consolidation according to the salience of the stimuli. I will accordingly discuss the role of the amygdala, another relatively conserved brain structure, in modulating hippocampal activity to prioritize declarative memory based on affective salience in both rats and humans.

10:40-10:55 AM (166)

The Folutionary Energence **6** Explicit Categorization. BARBARA A. CHURCH, *Georgia State University* – Cognitive neuroscientists distinguish different lærning sytems hat influence categorization and perceptual discrimination to map how different brain systems produce distinguishable types of learning and cognitive processing. One theoretical distinction from cognitive neuroscience that has been particularly fruitful for aiding our understanding of perceptual category learning contrasts implicit-procedural category learning (stimulusresponse associations cemented by reinforcement) and explicitdeclarative category learning (category rules discovered through hypothesis testing). These systems are often dissociated using category-learning tasks with either a multidimensional, information-integration (II) solution or a unidimensional, rulebased (RB) solution. This presentation will review the studies that map the phylogeny of category-learning systems using these tasks, focusing on species similarities and differences and on what these may tell us about the component processes and representations that support explicit category learning. I will also discuss initial data exploring category learning in primates when the implicit-procedural system is compromised.

11:00-11:15 AM (167)

Studies of Metacognition and Dissociations in Memory in Monkeys Suggest Explicit Cognition. ROBERT HAMPTON, Emory University - Rhesus monkeys sometimes "know when they know," avoiding memory tests for which they do not remember the answer. They stop seeking information when they have enough to reach a valid decision. They actively hold information in working memory when they have the expectation of an upcoming memory test. Both behavioral and neural manipulations dissociate memory processes in monkeys. The apparently distinct memory systems revealed by these dissociations appear to parallel systems observed in humans that cleave along an implicit-explicit boundary. I will share techniques that may detect explicit cognition in nonverbal species and that are well anchored to overt behavior. We may already have many of the tools we need to identify explicit cognition in monkeys and other nonhuman animals, and we may be finding such processes.

11:20-11:35 AM (168)

Symbolic Representation Enhances Grey Parrot (Psittacus erithacus) Abstract Thought. IRENE M. PEPPERBERG, Harvard University - Premack (1983) argued that nonhumans who understand symbolic representation (in which a symbol stands for an object, an attribute, an action, etc.) have an enhanced ability to perform tasks that require abstract thinking, such as analogical reasoning. Premack focused on intraspecies studies using chimpanzees (Pan troglodytes), but his claims may also be true for cross-species comparisons. For example, a Grey parrot (Psittacus erithacus) that had been trained on symbolic representation could, like young children and similarly-trained apes, understand exact rather than approximate numerical meanings; only the latter are understood by nonhumans without symbolic representation. Just like ~4-year-old children, he could also infer cardinality from ordinality, something apes however have not yet demonstrated (Pepperberg & Carey, 2012). Another similarly-trained parrot demonstrated Piagetian probabilistic reasoning at a level comparable to ~6-year-old children and at a level beyond that of untrained apes (Clements et al., 2017). I briefly discuss these experiments.

11:40-11:55 AM (169)

Comparing Paradigms of Conscious Cognition in Humans and Non-human Primates. BENNETT SCHWARTZ, *Florida International University* – Reverse engineering human cognitive evolution is a dicey proposition. Many of the most critical aspects of contemporary human cognitive functionality (e.g., reading, fixing a car) evolved historically in a time frame for which biological natural selection cannot account. Because of this, the best way to understand the factors that may have led to human cognition evolution is to look at cognitive processes in non-human primates. When we find analogs of conscious cognition (e.g., episodic memory, metacognition) in apes or monkeys, this may inform us about the evolution of our cognition, as well as how that species engages with the world. I consider one paradigm that has been used to address the evolution of cognition in humans - survival processing - and discuss how it maps to non-human primates. Then I consider the ways in which episodic memory and metacognition have been addressed in non-human primates and apply it to human cognition.

Metacognition 520 B, Saturday Morning, 10:00 AM-12:00 PM Chaired by Steven Smith, Texas A&M University

10:00-10:15 AM (170)

Phenomenological Consequences of Resolving Laboratory Induced Mental Fixation. STEVEN M. SMITH, ZSOLT BEDA, and JOSEPH M. ORR, Texas A&M University - How does it feel to resolve a mental block? Metacognitive reports of pleasure, suddenness, and difficulty were made when participants solved problems experimentally associated with red herrings. Our method involved initial priming; some problem solutions and red herring stimuli (wrong answers to subsequent problems) were studied and practiced. A subsequent test phase involved solving problems related to the primed stimuli. Problem solving tasks included word fragment completion (e.g., red herring ANALOGY, complete the fragment A_L_ _GY), an implicit memory test, anagram solving (e.g., red herring ACCENT, unscramble CENTA), an insight problem, and Remote Associates Test problems (e.g., red herring GREEN, what word goes with each test word - APPLE-HOUSE-FAMILY), a creative problem solving test. Solving problems with primed red herrings, relative to controls, was associated with greater feelings of difficulty, pleasure, and suddenness. We will also discuss neuroscientific implications of our findings. Email: Steven M. Smith, stevesmith@tamu.edu

10:20-10:35 AM (171)

The Frog and the Tadpole: Fighting the Hindsight Bias. LISA K. SON, *Barnard College*, SEOKSUNG HONG, *Ajou University*, TAE HOON KIM, *Kyungnam University*, YOONHYOUNG LEE, *Yeungnam University*, KYUNGIL KIM, *Ajou University* – "The Frog Knows Not the Tadpole," a well-known Korean saying, describes *hindsight bias*, or the "I-knew-it-all-along" effect, where current, more expert, knowledge interferes with the ability to accurately recall judgments made in a previous, naïve state. In this study, we explored potential differences in the size of the bias among Korean and US college students using a picture identification task. Once participants were able to identify increasingly clearer pictures of objects, they then judged the point at which they had identified the objects.

Results showed that while hindsight bias occurred in both cultures – they judged that they had identified the object earlier than they actually had – the bias was slightly larger for the US participants. In a second study, we tested whether "thinking like a tadpole" – imagining themselves as 3^{rd} or 5^{th} graders – would help decrease the bias in "frog-like" adult participants in the US. Results showed that when prompted to "estimate the identification abilities of children," the hindsight bias disappeared. Our data suggest that there are simple ways in which to avoid hindsight bias, and we believe that such methods will be valuable for encouraging "desirable difficulties" in young children.

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10:40-10:55 AM (172)

Reducing the Effect of Repetition on Truth Judgments. LISA K. FAZIO, Vanderbilt University - Politicians, advertisers and scammers often repeat false or misleading claims. Research on the illusory truth effect suggests that this repetition is likely to be effective; repeated statements are given higher truth ratings than novel statements. Across four experiments, we explored possible manipulations that may reduce the effect of repetition on truth ratings. Prompting participants to explain how they knew that a statement was true or false or to count the number of vowels in the statement generally reduced or eliminated the effect of repetition. However, a simple pause between reading the statement and providing a rating was not effective in reducing the repetition effect. The results suggest that an active task can reduce people's reliance on flawed cues such as repetition and increase their reliance more accurate cues such as their prior knowledge.

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11:00-11:15 AM (173)

Using Metacognitive Support to Facilitate Active Learning in ADHD. DOUGLAS MARKANT and MEAGAN PADRO, University of North Carolina at Charlotte - A growing body of research suggests that "active learning"-where students exert control over their learning experience-improves outcomes relative to passive instruction. Yet it is unclear whether the benefits of active learning extend to lower ability students who are less able to monitor their learning progress and make decisions about how to study. We examined the effects of active control on learning among individuals with ADHD, a population with deficits in executive functioning which may impede active learning. Participants performed a transitive inference task in which they learned a relational hierarchy. During active study participants controlled the selection of items, whereas in passive study the training sequence was predetermined. In a third condition we examined whether the inclusion of metacognitive prompts would facilitate active learning for lower ability learners. Whereas learners with ADHD did not benefit from active study compared to passive study, the inclusion of metacognitive prompts significantly improved performance over the other conditions. These results suggest that metacognitive support may be critical to generalizing the benefits of active learning to students with impaired executive functioning.

Email: Douglas Markant, dmarkant@uncc.edu

11:20-11:35 AM (174)

Metacognition in an Ecological, Multi-Modal Setting. MAHIKO KONISHI, Ecole Normale Superieure, VINCENT DE GARDELLE, Centre d'Economie de la Sorbonne, CNRS, BRUNO BERBERIAN, ONERA, JÉRÔME SACKUR, Ecole Normale Superieure - When people do multiple tasks at the same time, it is often found that their performance is worse relative to when they do those same tasks in isolation. Indeed, error rates and response times (the Type 1 performance) have been repeatedly found to increase when multitasking. However, one aspect that has received little empirical attention in comparison, is whether observers are aware of these effects (their Type 2 performance). In a previous study, using a simple dual-task visual paradigm, we found that metacognition was unaffected by multitasking. In order to understand if this result could be generalised to other types of multitasking, we further developed a multi-modal paradigm, involving a motor tracking task, a visual detection task, and an auditory n-back task. We made participants perform these tasks in different combinations of single-, dual-, and triple-tasking, and asked them to assess their own performance on a trial-by-trial basis. Comparing these different conditions, we discuss our results in the light of the influence that multitasking, and the specific type of task, has both on type 1 and type 2 performance, as well as on participants' metacognitive bias.

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11:40-11:55 AM (175)

Episodic Retrieval and Metacognition During Problem Solving. NADIA M. BRASHIER, CATHERINE H. HO, T'AJMAL K. HOGUE, and DANIEL L. SCHACTER, Harvard University - When faced with a difficult problem, people often rely on past experiences. For example, recent studies show that brief training in recollecting details of a recent event helps people to solve social means-end and personally worrisome problems. Episodic retrieval clearly benefits problem-solving performance, but how does it affect metacognition? Do people feel better prepared to address a problem when they rely on memory to solve it? In two experiments, participants learned tips for "worst case scenarios" (e.g., shark attack). Later, they listed steps to solve these problems (retrieval), as well as for new problems for which they had not previously received any tips (generation). Participants also indicated how prepared they felt for each scenario. In the retrieval condition, participants provided more steps relevant to solving problems than in the generation condition, and they also felt more prepared to address those problems.

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Cognitive Control III 520 F, Saturday Morning, 10:00 AM-12:00 PM Chaired by Ulrich Mayr, University of Oregon

10:00-10:15 AM (176)

The Role of Conjuctive Representations in Selecting and Stopping Actions. ULRICH MAYR and ATUSHI KIKUMOTO, *University of Oregon* (Presented by Ulrich Mayr) – According to prominent theories of action control (e.g., event-coding theory), representations that combine stimuli, responses, and rules in a nonlinear manner are critical for the selection and control of action. Yet, direct, human-level evidence for this claim is largely missing. Our participants performed a combined spatial-rules selection and stopsignal task. We applied representational-similarity analyses to time-frequency profiles of single trial EEG activity to decode action-relevant representations, including stimulus/response/ rule conjunctions, in a time-resolved manner. Across two experiments, we found that on successful stop-signal trials compared to no-signal trials, conjunction representations were suppressed, and that conjunction representations prior to the stop-signal were a particularly strong predictor of trial-to-trial variability in stopping success. Combined, these results confirm that the dynamics of task-relevant representations can be tracked via EEG decoding and that conjunction representations are indeed highly critical determinants of successful action selection and control.

Email: Ulrich Mayr, mayr@uoregon.edu

10:20-10:35 AM (177)

A Model-Based Analysis of Strategic Response Slowing in the Stop-Signal Paradigm. DORA MATZKE, University of Amsterdam, RODERICK GARTON, ANGUS REYNOLDS, MARK R. HINDER, and ANDREW HEATHCOTE, University of Tasmania - Response inhibition is frequently investigated using the stop-signal paradigm where participants perform a response-time task, such as responding to the direction of an arrow. Occasionally, this "go" task is interrupted by a stop signal that instructs participants to withhold their response. Response inhibition is typically formalized as a race between an independent go and stop process. Although the race model enables estimation of the latency of the unobservable stop response, it cannot give direct insights into the cognitive processes that contribute to stop-signal performance. To address this shortcoming, we develop a stop-signal race model based on an evidence-accumulation architecture. The model enables researchers to decompose go performance in terms of parameters that directly quantify latent cognitive processes, such as response caution and the rate of evidence accumulation. We use the model to investigate the cognitive processes contributing to the strategic slowing of go RTs in a novel stopsignal data set.

Email: Dora Matzke, d.matzke@uva.nl

10:40-10:55 AM (178)

Trust me, I Know What I'm Not Doing: Re-Thinking Basic Principles of (Multiple) Action Control. TIM RAETTIG and LYNN HUESTEGGE, University of Würzburg – We discuss the idea that actions do not have to be represented in terms of their own execution ("Executive Coding"), but can also be coded in terms of the *inhibition* of other actions ("Inhibitory Coding") whenever there is a prepotent "default" behavior. This proposal implies a radical departure from tacit assumptions of existing theories of action control and entails that dual actions may not always be represented compositionally (i.e., in terms of the execution of two "atomic" single actions). As an empirical test, we manipulated the expectancy of single and dual actions in four behavioral experiments. Crucially, while there were significant condition-specific benefits of high expectancy in terms of reduced error rates and reaction times, there was no transfer of expectancy benefits between the same action as a single action and as part of dual actions. These results are compatible with Inhibitory Coding, but not Executive Coding. Email: Tim Raettig, tim.raettig@uni-wuerzburg.de

11:00-11:15 AM (179)

Stage Specific Mechanisms of Conflict-Encoding from Sequence (Gratton) Effects. SCOTT WATTER and MELISSA J. PTOK, McMaster University - A growing number of congruency/conflict studies have demonstrated better memory for stimuli in high-conflict situations, arguably due to increased cognitive control and high-level attentional processes elicited by processing conflict. Most studies assume conflict enhances memory for a trial generally; however, Ptok et al. (2019) show memory benefits only occur when processing conflict elicits increased control to focus on to-be-tested item information - typically incongruent priming of semantic information, but not incongruent response priming. We examine trial sequence conflict (Gratton) effects within this framework and describe a model where greater conflict and control from trial n-1 induces greater processing focus on response selection in trial n, but produces no memory enhancement despite greater task conflict. We show additive and interactive RT patters of sequence conflict with semantic and response congruency priming, respectively, with memory enhancement only with semantic priming and not from direct response priming or sequence conflict effects. The lack of conflict-encoding effects from sequence (Gratton) conflict is directly predicted from our stage specific conflictencoding model.

Email: Scott Watter, watter@mcmaster.ca

11:20-11:35 AM (180)

Culture and Cognition: Ideomotor Learning in the Netherlands, Germany, and Italy. BERNHARD HOMMEL, Leiden University, DAVID DIGNATH, Freiburg University, HENK VAN STEENBERGEN, Leiden University, FRANCESCA CIARDO and AGNIESZKA WYKOWSKA, Istituto Italiano di Tecnologia, ANDREAS EDER, University of Würzburg -Ideomotor theories predict that people acquire bidirectional associations between actions and their perceptual effects on the fly, which has been confirmed by findings showing that responding to previously acquired action effects is easier if they are consistent with the previous learning history. Such actioneffect-mapping consistency effects have often been replicated but turned out to be difficult to replicate in some cultural contexts. Experiment 1 reports three of such failures to replicate in the Netherlands and Experiment 2 compares consistency effects obtained in the Netherlands with effects obtained in Germany and Italy. Consistency interacted with country in the error rates, which showed significant effects in the Netherlands and Italy but not in Germany. Although this interaction was not significant in reaction times, separate testing failed to show a significant consistency effect in the Dutch sample. Findings suggest that even for basic cognitive phenomena, the cultural context matters more than commonly assumed.

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11:40-11:55 AM (181)

Pupillometry: Towards a Physiological index of Cognitive Effort Exertion. ROSS OTTO, KEVIN DA SILVA CASTANHEIRA, and MYLES LOPARCO, McGill University (Presented by Ross Otto) - Cognitive effort-the experience of mental exertion derived from cognitive resource deploymentremains a difficult construct to quantify empirically. Recent pupillometry work hints that the task-evoked pupillary response (TEPR) might index effort exertion, despite its longdocumented association with task demand: increases in task difficulty are associated to larger pupil diameter. Here we aimed to differentiate these accounts, by leveraging an individual differences approach to examining TEPRs during an incentivized task-switching paradigm, for which flexible responding in the face of task rules shifts demands executive control. Consistent with the effort account, we find that in the absence of reward incentives, TEPRs accompanying task switches (negatively) predict individual differences in switch costs-an established behavioural marker of effort exertion. Furthermore, this relationship is mediated by individual differences in executive function, as measured by Stroop interference costs. Further supporting the effort account, reward-induced TEPR increases predict reward-induced switch-cost reductions. Together, our results suggest that TEPRs, independent of task demand, appear to index an individual's level of effort investment. Email: Ross Otto, ross.otto@mcgill.ca

Discourse Processes I 520 C, Saturday Morning, 10:20 AM-12:00 PM Chaired by Christopher Wolfe, Miami University

10:20-10:35 AM (182)

Gist Inference Scores Predict Comprehension of Texts About Cancer. CHRISTOPHER R. WOLFE, MITCHELL DANDIGNAC, RACHEL SULLIVAN, and TATUM MOLESKI, Miami University, VALERIE F. REYNA, Cornell University -Following Fuzzy-Trace Theory (FTT), we used the discourse technology Coh-Metrix to develop Gist Inference Scores (GIS) to analyze characteristics of texts that promote inferences about their bottom-line meaning. We applied GIS to texts for patients on the National Cancer Institute (NCI) website. Previously, we found that NCI texts for patients actually scored lower on GIS than those for physicians. In two experiments using fill-in-theblanks (Cloze) procedures to assess the comprehension of nine texts, we tested the prediction that NCI patient texts with higher GIS would yield higher comprehension than texts of medium or low GIS. As predicted, high-GIS texts yielded significantly higher mean Cloze scores than medium-GIS or low-GIS texts. Results were replicated in a second study using a different Cloze procedure. These results, predicted by FTT, provide evidence of the utility of GIS in identifying quantifiable text characteristics most likely to be useful in yielding gist inferences for decisionmaking.

Email: Christopher R. Wolfe, WolfeCR@MiamiOH.edu

10:40-10:55 AM (183)

Early Conversational Interaction and Task Performance. JENNIFER S. PARDO, ALEXANDER BACHERT, MONIQUE OWCZAREK, GEORGE PAULJOHN, and BETHANY TRILONE, Montclair State University - In the Montclair Map Task Corpus, performance of males in same-sex pairings differed from pairings that included females with respect to aspects of conversational style and their relationship with task performance. Previous analyses of the corpus have revealed that same-sex pairs of male interlocutors were less efficient than pairs involving females, and analyses of speaking rate, inter-turn intervals, and turn exchange overlaps reveal similar complexities with respect to pair composition. Most of these differences occur within the first two map pairs in these interactions. The current analyses examine turn exchanges, turn-overlaps, and backchannels in early phases of conversational interaction, revealing distinct stylistic patterns in same-sex male pairs that relate to observed decrements in talker and partner task performance.

Email: Jennifer S. Pardo, pardoj@montclair.edu

11:00-11:15 AM (184)

Validating Presupposed Text Concepts in Question Constructions. MURRAY SINGER and JACKIE SPEAR, University of Manitoba - Readers continually evaluate the consistency and coherence of text by processes of validation. Notwithstanding evidence that presupposed anomalies are often overlooked (e.g., in the Moses illusion), we previously documented readers' detection of presupposed inconsistencies; such as in cleft constructions (Singer, Solar, & Spear, Memory & Cognition, 2017). New experiments examined validation for question constructions in text. Validation was evaluated in terms of the consistency effect (O'Brien & Albrecht, JEP:LMC, 1993), comprising greater reading time for inconsistent than consistent target sentences. In contrast with clefts, Experiments 1 and 2 yielded minimal or no consistency effects when the presupposed shark mismatched its antecedent tuna in complement questions such as His wife asked if the SHARK was his first fish. In a comparison of clefts and questions, Experiment 3 yielded a consistency effect only for clefts. Experiment 4 indicated that readers are aware of presupposed complement-question mismatches when explicitly asked about them. Why readers may overlook question mismatches is discussed with reference to contemporary theoretical analyses of text validation.

Email: Murray Singer, m_singer@umanitoba.ca

11:20-11:35 AM (185)

Conceptual Pacts and Definiteness during Reference Making. DELPHINE DAHAN, *University of Pennsylvania* – When talking about a specific entity multiple times, people tend to reuse an expression produced earlier. Whether this reflects an agreement between conversational partners on how to conceptualize or refer to the entity, or mere lexical accessibility, has been debated. In a referential-communication task involving photos of everyday man-made objects, we examined what affected participants' production of a precedent rather than a novel description, and what affected their production of a definite Noun Phrase (NP), a grammatical device that, in the present task, conveys that the referent is mutually known, rather than an indefinite or bare NP. The rate of precedents produced the second time an object was discussed was greater for objects with high naming consensus (i.e., object that received, across all participants, only a few descriptions) than for objects with low naming consensus. However, the use of definite noun phrase showed the opposite effect. Thus, although precedents may help addressees identify referents, they may not be intended as a referential device.

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11:40-11:55 AM (186)

The Extreme Illusion of Communication. BOAZ KEYSAR, BECKY LAU, YANTING WU, and JANET GEIPEL, University of Chicago (Presented by Boaz Keysar) - According to the book of Proverbs "Death and life are in the power of the tongue," yet researchers know little about the extent of miscommunication and the reasons for it. We discovered that the very attempt to communicate results in an extreme illusion of communication that is shared by a speaker and a listener. Speakers overestimated how much they were understood, and listeners overestimated how much they understood. A foreign language did not reduce the illusion, as native Cantonese-speaking interlocutors overestimated communicative effectiveness even when using Mandarin. This joint illusion is present even when interlocutors do not share a language. Chinese speakers overestimated by 15 percentage points how much listeners who don't know Chinese will understand them speaking Chinese. Though native English-speaking listeners understood better than chance, they still overestimated their own understanding by 30 percentage points. Attempting to communicate, then, leads to the joint illusion of mutual understanding.

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Emotion and Cognition 519 B, Saturday Morning, 10:20 AM-12:00 PM Chaired by Andrew Gallup, SUNY Polytechnic Institute

10:20-10:35 AM (187)

Does Acetaminophen Alter Perception of Threatening Stimuli? A Double-Blind Placebo-Controlled Study. ANDREW C. GALLUP and BRIANDA GAGNON, SUNY Polytechnic Institute, OMAR TONSI ELDAKAR, Nova Southeastern University - Recent studies have shown that the painkilling drug acetaminophen (paracetamol, Tylenol), which is the most widely used medication in the United States, can diminish forms of psychological pain and distress by altering cortical activity. Despite a growing interest in this area within the last few years, there is limited research examining the range of psychoactive effects produced by this drug. The current study intersects with the fields of evolutionary psychology and psychopharmacology by investigating whether acetaminophen modulates responses to stimuli that vary in ancestral and evolutionary relevance. In particular, we assess how acetaminophen alters the evaluation sensitivity to images of snakes and spiders vs. syringes and guns. It is hypothesized that the prewired neural substrates controlling responses to ancestrally relevant fear-related stimuli (e.g., snakes and

spiders) will be less susceptible to the generalized dampening of affective and cognitive processing produced by acetaminophen. Research is still in progress, but we propose that similar psychopharmacological techniques could provide a robust method for testing evolutionary hypotheses of human behavior. Email: Andrew C. Gallup, gallupa@sunypoly.edu

10:40-10:55 AM (188)

Controlling for Expectation: Microdosing Psychedelics Enhances Recognition of Other's Emotions, a Longitudinal Triple-Blind Randomized Placebo-Controlled Field Study. LORENZA COLZATO, Ruhr University Bochum, MARIA J. MARAVER and BERNHARD HOMMEL, Leiden University -Taking small doses ("microdosing") of psychedelic substances such as truffles allegedly has multiple beneficial effects, including emotion recognition, via its primary effects by directly binding to 5-HT_{2A} receptors. The goal of this study was to examine, for the first time, the quantitative longitudinal effects of microdosing psychedelic truffles on the ability to recognize emotions of others, controlling for expectation effects. We carried out the first longitudinal (with participants taking 6 microdoses over the course of 18 days) triple-blind, between-group, placebo-controlled field study employing the Reading the Mind in the Eyes Test (RMET) in 59 young healthy participants. Taking microdoses of psychedelic substances, compared to placebo, improved performance on the RMET. This effect was restricted to the difficult items and was independent from expectation effects. Our data suggest that microdosing psychedelics improves the ability to infer the mental state of others. Clinical applications can be derived from these findings, considering the potential use of microdosing psychedelics for the treatment of pathologies associated with dysfunctional emotion recognition, such as depression, autism and social anxiety.

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11:00-11:15 AM (189)

Boosting Emotional Facial Expressivity: Transcutaneous Vagus Nerve Stimulation (tVNS) Enhances Facial Mimicry. JULIA KOZLIK and RICO FISCHER, University of Greifswald, MARIA J. MARAVER and LORENZA COLZATO, Leiden University - Since Darwin the vagus nerve has been proposed as an essential anatomical foundation enabling optimal social interactions. Specifically, vagal activity is assumed to be causally related to facial expressivity. Although repeatedly proposed supporting empirical evidence is exclusively correlative in nature. Here we aimed at directly testing the proposed causal link between vagal activity and facial expressivity as indexed by facial mimicry. For this, we employed transcutaneous vagus nerve stimulation (tVNS), a non-invasive neuromodulation technique that manipulates vagal activity by superficially stimulating the cymba conchae - a vagally innervated region of the external ear. In two sessions, participants received active or sham stimulation before and during performing a facial mimicry task including electromyographic recordings. We observed a typical facial mimicry effect which, importantly, was more pronounced in the active as compared to the sham condition. Thus, our study is the first to demonstrate a causal role of vagal activity in facial expressivity which expands existing knowledge about the neuroanatomical regulation of facial mimicry and highlights the role of vagal activity for optimal socio-emotional functioning.

Email: Julia Kozlik, julia.kozlik@uni-greifswald.de

11:20-11:35 AM (190)

The Expressive and Regulatory Roles of Metaphor for Emotion. VICKY TZUYIN LAI, MATTHIAS MEHL, NYSSA BULKES, ANIHA KUMAR, and LI-CHUAN KU, University of Arizona - Research indicated that people use more metaphors when describing their feelings than actions. Psychotherapy clients also use many metaphors, e.g. falling apart. We ask whether contextual emotionality or abstractness drives the increased metaphor frequency, and whether metaphor use benefits people by regulating emotion. Participants (N=104) wrote down either a sad or an intellectual memory in part-1. In part-2, half were instructed to re-describe the same memory using metaphors, and the other half, to describe it again. Participants rated their mood before part-1 (time-1), between parts (time-2), and after part-2 (time-3). People used more metaphors for sad than for intellectual memories (p<.05), even when the two were equally abstract. After describing sad memories, everyone's mood dropped from time-1 to time-2 (p<.0001). But those that used metaphors in part-2 did not feel worse (p=.51), unlike those that did not use metaphors (p<.01). Metaphor plays an important role in the regulation of emotion. Email: Vicky Tzuyin Lai, tzuyinlai@email.arizona.edu

11:40-11:55 AM (191)

Vowel Phoneme Space Maps onto Russell's Circumplex Model of Emotion. MICHAEL K. MCBEATH, CHRISTINE S.P. YU, ELY GREENSTEIN, THERESA LOBATO, K. JAKOB PATTEN, and ARTHUR M. GLENBERG, Arizona State University - Ekman and others documented that emotional states produce reliable, visually-recognizable facial musculature patterns. The present research explores if a parallel recognition pattern occurs in audition. Following the lead of Helmholtz, we chose to explore the acoustically-salient domain of vowel phonemes. We tested if vowel similarity-space for production and perception maps onto Russell's Circumplex Model of emotion. In a series of experiments, we hypothesized and confirmed: (1) One dimension of vowel space, the axis of /i:/ vs /^/, is correlated with tone color, and (2) It maps onto an emotional dimension with /i:/-words (as in "gleam") rated as more positively-valenced than matched /^/-words (as in "glum"). We also hypothesized and confirmed: (3) The orthogonal vowel space dimension, the axis of /æ/ vs /u/, is correlated with consonance-dissonance, and (4) It maps onto the orthogonal emotional dimension with $/\alpha$ -words (as in "wham") rated as more arousing than matched /u/-words (as in "womb"). Our findings support a naturally-selected perceptual salience of phonemes that is consistent with their association with facial musculature patterns, which can facilitate acoustic communication of important emotional information. Email: Michael K McBeath, Michael.McBeath@asu.edu

Reasoning and Problem Solving 520 A, Saturday Morning, 10:20 AM-12:00 PM Chaired by Jeffrey J. Starns, University of Massachusetts, Amherst

10:20-10:35 AM (192)

Spatial Representations of Probability Support Active Learning of Bayes Theorem. JEFFREY J. STARNS, University of Massachusetts, Amherst, ANDREW L. COHEN, University of Massachusetts, Amherst, CARA BOSCO, WILLIAM LOUGEE RODRIGUEZ and JOSEPH VAZQUEZ, University of Massachusetts, Amherst - Starns, Cohen, Bosco, & Hirst (2019) developed a spatial method for solving Bayesian inference problems and demonstrated that people can use it successfully after brief training. The current project explored the spatial technique as a tool to promote active learning of the Bayes theorem equation. In a classroom setting, students trained in the spatial method were challenged to specify the math needed to complete each step in applying Bayes Theorem. Over 75% of students were able to do so despite receiving no direct instruction on the equation, demonstrating that they correctly linked the spatial method to abstract math. These results were replicated in a lab sample, and additional experimental work demonstrated that many students can also self-discover how to use the spatial method without direct instruction. Overall, results suggest that spatial representations of probability are an effective way to promote active learning of Bayesian concepts. Email: Jeffrey J. Starns, jstarns@psych.umass.edu

10:40-10:55 AM (193)

Diagramming Causal Models Improves Correlation-Causation Discrimination. AUDREY L. MICHAL, COLLEEN SEIFERT, and PRITI SHAH, University of Michigan - Causality bias is the tendency to erroneously interpret correlations (A is associated with *B*) as one-way causal relationships (*A* causes *B*). We asked whether practice with drawing diagrams of alternative causal models (e.g., a third variable C causes both A and B; B causes A) could improve people's ability to detect causality bias and generate alternative causal models. During pretest and posttest assessments, college students (N=97) evaluated a set of fictional science media reports that contained causality bias. Half of the participants (experimental) received extended instruction and practice drawing diagrams of alternative causal models for correlations in between assessments; the control group completed assessments consecutively. The experimental group improved their ability to detect causality bias and generate valid alternative causal models from pretest to posttest relative to the control group. Diagramming multiple causal models of correlational relationships thus shows promise as an effective tool for reducing causality bias.

Email: Audrey Michal, almichal@umich.edu

11:00-11:15 AM (194)

Improving Probability Judgment in Intelligence Analysis: From Structured Analysis to Statistical Aggregation. DAVID R. MANDEL, *Defence Research and Development Canada*, CHRISTOPHER W. KARVETSKI, *KaDSci LLC*, DANIEL IRWIN, *Defence Research and Development Canada* – As in other areas of expert judgment, intelligence analysis often requires judging the probability that hypotheses are true. Intelligence organizations promote the use of structured methods such as "Analysis of Competing Hypotheses" (ACH) to improve judgment accuracy and analytic rigor, but these methods have received little empirical testing. In this experiment, we pitted ACH against a factorized Bayes theorem (FBT) method, and we examined the value of recalibration (coherentization) and aggregation methods for improving the accuracy of probability judgment. Analytic techniques such as ACH and FBT were ineffective in improving accuracy and handling correlated evidence, and ACH in fact decreased the coherence of probability judgments. In contrast, statistical postanalytic methods (i.e., coherentization and aggregation) yielded large accuracy gains. A wide range of implementation methods for instantiating these techniques was tested. The interactions among the factors considered suggest that prescriptive theorists and interventionists should examine the value of ensembles of judgment-support methods. As well, organizations that

analytic statistical judgment correctives.

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11:20-11:35 AM (195)

produce expert judgment should pay closer attention to post-

Toward a Remedy for Inert Knowledge: Evaluating Different Facets of Category Status for Promoting Spontaneous Transfer. KENNETH J. KURTZ and SEAN SNODDY, Binghamton University, SUNY - We investigated a set of study tasks designed to promote different facets of category-level representation of a target principle in terms of their impact on spontaneous analogical transfer. A Baseline group compared two analogous cases; the remaining groups experienced comparison plus another task intended to impact the category status of the knowledge representation. The Intension group read an abstract statement of the principle with a supported task of generating a new case. The Extension group read two more positive cases with the task of judging whether each exemplified the target principle. The Mapping group read a contrast case with the task of revising it into a positive example of the target principle (thereby providing practice moving in both directions between type and token, i.e., evaluating a given case relative to knowledge and using knowledge to generate a revised case). Experimental results and implications for theories of analogical transfer are discussed.

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11:40-11:55 AM (196)

Fast and Slow Selfishness: A Critical Test of the Dual Process Model of Human Cooperation. WIM DE NEYS, *CNRS & Université de Paris*, BENCE BAGO, *Institute for Advanced Study in Toulouse*, JEAN-FRANÇOIS BONNEFON, *Toulouse School of Economics* (Presented by Wim De Neys) – Fastand-slow models of prosociality emphasize the ability to correct spontaneous intuitions through effortful deliberation. If deliberation has a substantial and systematic effect on prosociality, whatever its direction, we can promote prosociality through policies that tune up or down people's propensity to deliberation. In contrast, here we show that deliberation is practically irrelevant to prosociality. Using a two-response protocol across seven studies and three economic games, we observed that few players changed their intuitive decision when given a chance to deliberate; and the few players who did, were equally likely to move toward selfishness or prosociality. Since prosociality is chiefly a matter of competing intuitions, behavioral policies should attempt to shift the balance between intuitions, rather than the balance between intuition and deliberation

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Lunchtime Workshop: Information Session: Funding at the National Science Foundation

Room 521 A-B, Saturday, 12:00-1:30 PM

Lunchtime Workshop: Workshop on Non-academic Careers for Psychologists

Room 519 A, Saturday, 12:00-1:30 PM

Symposium IV: Beyond a Single Participant: Interactive Social Cognition in Dyads and Groups 517 D, Saturday Afternoon, 1:30-3:30 PM Chaired by Jelena Ristic, McGill University

1:30-1:45 PM (197)

Introduction and Overview. JELENA RISTIC, *McGill University*

1:50-2:05 PM (198)

How to Measure When Two Heads are Better than One. JAMES ENNS, *University of British Columbia* – Failure to distinguish between statistical effects and genuine social interaction may lead to unwarranted conclusions about collaborative cognition. I will introduce these issues in the application of the race model inequality (Miller et al., 1982; 2007) to a collaborative visual search task. A series of studies show that collaborative benefits can be predicted by the strength of friendship, similarity of verbal communication, availability of visual body language, and by EEG signals measuring local phase synchronization and inter-brain phase synchronization in members of a search team.

2:10-2:25 PM (199)

"We Duet Together": Investigating Agency During Interpersonal Coordination Using E-music Boxes. JANEEN LOEHR and JUSTIN CHRISTENSEN, University of Saskatchewan (Presented by Janeen Loehr) - The sense of agency, that is, the feeling of control over actions and their consequences, is an important component of metacognition for action. Most research on the sense of agency has focused on individuals performing actions alone. However, the sense of agency may be substantially different when people coordinate their actions together with other people. Each person may experience self-agency (a feeling of self-control), other-agency (a feeling of control over others' actions), and/or joint agency (a feeling of shared control). Ensemble music performance is a quintessential example of close interpersonal coordination that is likely to elicit these experiences of agency. In our research, novices use E-music boxes (electronic versions of mechanical music boxes) to perform musical duets and then rate their experiences of agency. Our findings elucidate the relationship between individual and joint agency and the conditions that strengthen the experience of joint agency.

2:30-2:45 PM (200)

The Dual Function of Visual Attention in Social Hierarchies: A Perfect Tool Subserving Interactive Social Cognition. MATTHIAS GOBEL, Brunel University London - The functional role of visual attention within social hierarchies (i.e., when looking at or looking with others of higher or lower rank) remains a topic of scientific debate. Using an interdisciplinary experimental approach integrating social psychological, cognitive, and neuroscientific methodology, I will first discuss under what real-world conditions people change the locus of their attention when looking at higher and lower ranked others, and I will then discuss to what end people change the locus of their attention when looking with them. Results consistently suggest that shifting visual attention in social hierarchies - and presumably across social contexts - fulfills a dual function: It gathers information from others, and it signals information back to them. Such social attention might be a key mechanism for the facilitation of interpersonal communication and behavioural coordination, making looking at and looking with higher ranked individuals a perfect social tool subserving interactive social cognition.

2:50-3:05 PM (201)

The Language of the Eyes: How Looking Behavior Indexes Group Dynamics and Predicts Individual Socio-Cognitive Functions. FRANCESCA CAPOZZI and JELENA RISTIC, McGill University - Group interactions play an important role in shaping individual social and cognitive styles. However, the link between group dynamics and individual function remains rarely studied in cognitive research. Here, we show how patterns of looking behavior can be captured within live interacting groups to reliably index group social processes, like leadership and cooperation, and predict subsequent sociocognitive behaviors in group members. Specifically, we found that the amount of time a group member was looked at during a group interaction indexed leadership behaviors and predicted the magnitude of gaze following they elicited in other group members during a subsequent computerized gaze-following task. As such, these data provide one of the first studies showing how group social dynamics translates to affect individual sociocognitive function and behavior.

3:10-3:25 PM (202)

General Discussion and Q&A. ENTIRE PANEL, *McGill* University

Recognition Memory 520 A, Saturday Afternoon, 1:30-3:30 PM Chaired by Beatrice Kuhlmann, University of Mannheim

1:30-1:45 PM (203)

A Storage-Retrieval Extension of the Two-High-Threshold Multinomial Model of Source Monitoring. BEATRICE G. KUHLMANN and NIKOLETTA SYMEONIDOU, University of Mannheim - Who told me that? Apart from source memory, such source attributions are influenced by item memory and guessing processes. The two-high-threshold multinomial model of source monitoring (2HTSM; Bayen, Murnane, & Erdfelder, 1996) allows the independent measurement of these processes. However, its memory parameters are hybrid such that they reflect both successful storage and retrieval. Thus, lower source memory probabilities (model parameter d) may be due to either failed source storage and/or failed source retrieval. We propose a new empirical paradigm and tailored extension of the 2HTSM to separately measure the probabilities of source storage (new parameter d_s) and source retrieval (new parameter $d_{\rm c}$). Therefore, a standard source-monitoring test is followed by an additional test using source reinstatement (i.e., test words spoken by the original study voices) to facilitate source retrieval. We show that our Storage-Retrieval-2HTSM fits empirical data from this paradigm and that its source storage versus retrieval parameters respond to experimental manipulations of storage (repetition at study) and retrieval (partial reinstatement) as expected. In addition, we present a first application of this model to cognitive aging.

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1:50-2:05 PM (204)

Is it Ever Justified to Use d' as a Measure of Sensitivity? Researchers Should Adopt da as Their Default Measure of Sensitivity. YONATAN GOSHEN-GOTTSTEIN and ADVA LEVY, Tel-Aviv University, CAREN M. ROTELLO, University of Massachusetts, Amherst - False discoveries may be manifest even in highly replicable results. Rotello et al. (2008) explored binary-choice (yes/no) decisions, when the Gaussian equalvariance assumption underlying d' was violated. Significant differences in estimated accuracy between conditions that differed only in response bias were erroneously observed. This pattern was exacerbated-not attenuated-with larger sample sizes. Thus, when model assumptions are violated, sensitivity as measured by d' is confounded with bias. Here, we examined d, a measure that does not assume equal variances of underlying Gaussian distributions. Using Monte-Carlo simulations, we calculated frequency of Type-I errors for the comparison of d, keeping all conditions identical except for the placement of the response criteria (bias). Our findings reveal that for Gaussian distributions, Type-I error rates using d are typically much lower-hovering around 5%-than when using d'. We call researchers to adopt d_a as their default measure of sensitivity. Email: Yonatan Goshen-Gottstein, goshengott@gmail.com

2:10-2:25 PM (205)

Unintentional Forgetting is Beyond Cognitive Control. ASHLEIGH M. MAXCEY, Vanderbilt University - Intentional forgetting refers to the attempt to marshal top-down control to purposefully forget and has been demonstrated in the laboratory using directed forgetting paradigms. Here we asked whether the mechanisms of top-down control can run in the opposite direction to prevent the forgetting of information. That is, can we actively resist unintentional forgetting? Recognitioninduced forgetting is an unintentional forgetting effect in which accessing one memory leads to the forgetting of related memories. Just as intentional forgetting possesses intuitively appealing control over eliminating undesirable memories, resisting unintentional forgetting over desired memories would improve cognitive performance. We showed subjects a nine-minute video to teach them about the recognitioninduced forgetting paradigm and how recognition of certain objects unintentionally leads to forgetting of semantically related objects. Despite their knowledge of the forgetting effect, recognition-induced forgetting persisted. These results show that knowledge of this unintentional forgetting phenomenon and the challenge to resist forgetting do not eliminate it, suggesting that it is cognitively impenetrable.

Email: Ashleigh M. Maxcey, ammaxcey@gmail.com

2:30-2:45 PM (206)

Using EEG to Study Short-term Memory. RICHARD SHIFFRIN and THOMAS BUSEY, Indiana University, RUI CAO, Boston University, ROBERT NOSOFSKY, YASHA QURASHI, and ZIQI ZHAO, Indiana University - We use Contralateral Delay Activity (CDA) to explore short-term memory (STM). Stimuli are presented on both sides of fixation: one side is to be attended and remembered. Electrodes on the side contralateral to that attended show greater activity than those ipsilateral. In some paradigms the difference grows with the amount of material to be remembered, up to a small limit (taken to mean CDA measures STM capacity), and in others it does not. Ss studied a list of pictures followed by an oldnew recognition test. We observed a CDA advantage that did not grow as the items continued to arrive, even though task performance depended strongly on length of list. We suggest that this task induces the use of 'familiarity' to make decisions, where familiarity is based on matching the test object to the traces of the list objects, and summing the results. We further suggest that this strategy works well if each study item is attended as it arrives, and then ignored thereafter, because an attended item that is then ignored resides in short-term memory for a period of time before it is forgotten. Such a strategy will show a CDA STM capacity of one item. Other paradigms presumably require active maintenance and attention to all presented items. Email: Richard Shiffrin, shiffrin@indiana.edu

2:50-3:05 PM (207)

Models of Visual Short-Term Memory Should Include Memory for Prototypes. CHAD DUBÉ, University of South Florida – The generalized context model (GCM) has been extended to Sternberg scanning, suggesting recognition probes in visual short-term memory (VSTM) engage a pure exemplar-matching process. The wider literature on VSTM and visual perception, however, has produced a wealth of findings suggesting memory for central tendencies of visual features influences participants' responses and may do so obligatorily. I compare predictions and postdictions of a new "Compression" model (CM) incorporating central tendency representation to those of the GCM. The CM predicts the false alarm rate to prototype lures will substantially exceed the hit rate under conditions of high study-item homogeneity in a 2-item, 1-D study set, an effect which ranges from difficult to impossible for GCM to predict. These predictions are tested using results from the Sternberg task with spatial frequency gratings varying on one dimension. It is shown that the data are as predicted and postdicted by CM, but not GCM. While the results do not call GCM and its extensions into question as accounts of categorization, the demonstration does serve as an existence proof that models incorporating central tendency representation in VSTM are worth consideration. Email: Chad M Dubé, chaddube@usf.edu

3:10-3:25 PM (208)

Quantum Memory. C. J. BRAINERD, D. M. BIALER, M. CHANG, and K. NAKAMURA, Cornell University - Whereas quantum theories of reasoning have focused on modeling established phenomena, quantum memory theories have been chiefly concerned with predicting new effects. Among them are memory analogues of such well-known quantum phenomena as superposition, complementarity, interference between incompatible states, and entanglement. At a theoretical level, the search for quantum memory effects has been motivated by two features of fuzzy-trace theory's verbatim-gist distinctionnamely, that gist memory is congruent with logically incompatible reality states and that verbatim and gist traces capture incompatible forms of knowledge. These principles predict that episodic memory will exhibit analogues of quantum superposition, complementarity, and interference. We present data on six such memory analogues: overdistribution of item and source memory; super-overdistribution of item and source memory; and complementarity of true and false memory. These effects are paradoxical inasmuch as they violate simple logical principles (e.g., the disjunction and conjunction axioms of probability theory).

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Attention and Scene Processing 519 B, Saturday Afternoon, 1:30-3:30 PM Chaired by W. Joseph MacInnes, NRU Higher School of

Economics

1:30-1:45 PM (209)

Two Models to Improve Temporal Prediction in Simulating Salience. W. JOSEPH MACINNES, ELENA GORINA, GEORGII ZHULIKOV, LIYA MERZON, KRASOVSKAYA SOFIA, and TANYA MALEVICH, *NRU Higher School of Economics* – Computational models of visual salience are currently capable of simulating the full processing stream from visual input to fixation selection. While deep learning neural nets have improved classification of spatial fixations, they do so at the expense of the temporal prediction that existed in classic models (Itti & Koch, 2000). Temporal algorithms are incorporated into salience models to simulate the order of fixation selection but many do poorly on fixation latency distribution (eg., Leaky Integrate and Fire - Merzon, et al, submitted). We present two new accumulator model variants that account for these distributions. First, a temporal onset diffusion model with a leaky signal component is shown to abstract spatial input from a generated salience map and test different mechanisms of facilitation in a Posner cuing task. Finally, we present a spatio-temporal accumulator that implements lateral inhibition across the entire salience map (based on Usher & McLelland, 2001). Both models are modular in nature and may fit with many existing spatial salience classifiers, including deep learning solutions.

Email: W. Joseph MacInnes, jmacinnes@hse.ru

1:50-2:05 PM (210)

Parsing the Perceptual Gist of Multiparametric MRI. TODD S. HOROWITZ and MELISSA TREVINO, National Cancer Institute, MARCIN B. CZARNIECKI, Medstar Georgetown University Hospital, ISMAIL B. TURKBEY and PETER L. CHOYKE, National Cancer Institute - Trained radiologists can classify a case as normal or abnormal in a fraction of a second; the expert equivalent of gist perception for scenes. Here we studied perceptual gist in multiparametric MRI of the prostate (mpMRI). Which modality (i.e., imaging sequence: T2-weighted [T2W]; diffusion-weighted imaging [DWI]; or apparent diffusion coefficient [ADC]) generates the strongest gist? Three groups of five experienced radiologists viewed 100 images (50 lesion-present) from a single modality for 500 ms each. Participants made a forced-choice lesion localization response then reported whether or not a lesion was present. The ADC modality generated the strongest gist signal [d' mean(sd): T2W 0.83(0.51); DWI 0.80 (0.29); ADC 1.16(0.31)]. Eye tracking of four radiologists using T2W images demonstrated that lesion detection was unaffected by whether or not the observer fixated on the lesion. By parsing gist perception by modality, we can better understand what information radiologists use to guide their decisions.

Email: Todd Horowitz, todd.horowitz@nih.gov

2:10-2:25 PM (211)

Framing Space: A Cross-Cultural Assessment of Scene Cognition. HELENE INTRAUB and RUIMING DU, University of Delaware (Presented by Helene Intraub) - East Asians are thought to attend more holistically to scenes than Westerners, paying more attention to the scene's context (Masuda & Nisbett, 2001). Our participants (UD students from China vs. the U.S., N= 92) exhibited this cultural difference. When photographing a model in the same setting, Chinese participants' photographs encompassed more surrounding context, such that on average the model filled only 1/2 the area as in U.S. participants' photographs (Experiment 1). In Experiment 2, the same participants viewed 12 photographs of objects on natural backgrounds (10 s each). At test, closer or wider versions were presented, and participants adjusted the view-boundaries to match memory. Both groups exhibited boundary extension, but the scope of this overflowing scenecontext did not differ. Results suggest a limitation on the extent to which differences in cultural apprehension of scene-context affects cognition. Anticipatory spatial representation, which may serve navigation, appears to be untethered from cultural influence.

Email: Helene Intraub, intraub@psych.udel.edu

2:30-2:45 PM (212)

Releasing Natural Categories from Visual Crowding with Meaning. RACHEL A. SEARSTON and CARLY SULLIVAN, The University of Adelaide - Our ability to recognise objects is diminished when surrounded or "crowded" by visual clutter. Visual crowding limits what we can see across the visual field, constraining recognition of letters, faces, natural scenes, and a variety of basic visual features. Standard crowding manipulations present a target among cluttered items that are unrelated to the target category, such that averaging or confusing them impairs recognition. Here, we are less interested in how people recognise objects in meaningless clutter per se, but in how visual crowding might be exploited to extract categorical information from more meaningful displays. We will present a series of experiments where people classify briefly presented paintings under conditions of crowding with flanking paintings that are *congruent* (e.g. Monet crowded by other Impressionist paintings) or incongruent (e.g. Monet crowded by Cubist paintings) with the target artistic style. We explore the effects of flanker style on participants classification and discrimination of paintings and natural scenes. We argue that an exclusive focus on the errors produced by clutter misses the potential benefits of visual crowding for extracting meaningful categorical information in peripheral vision.

Email: Rachel A. Searston, rachel.searston@gmail.com

2:50-3:05 PM (213)

Where Do the Eyes Wander?: The Relationship Between Mind Wandering and the Allocation of Gaze to Visually Salient and Semantically Meaningful Scene Content. JAMES R. BROCKMOLE, KRISTINA KRASICH, and GREG HUFFMAN, University of Notre Dame (Presented by James Brockmole) - People spend nearly 50% of their time mind wandering as their attention shifts away from task-related thoughts. How is gaze control--a real-time index of the mind's information processing strategies--affected by this shift? Previous research has demonstrated that mind wandering is associated with fewer, longer, and more dispersed fixations. We investigated whether these shifts are independent of scene content or if mind wandering is also associated with changes in the way gaze control is linked to visual and semantic information within a scene. Participants studied photographs of real-world scenes and were occasionally asked to indicate if they were mind wandering or paying attention to the scene. Separating trials based on these responses, we correlated fixation locations with several established measures of both visual salience and semantic informativeness over the course of scene viewing. No consistent relationship between these parameters and mind wandering were observed. Thus, while it is clear that gaze control cannot be fully understood or modeled

without considering off-task attentional states, the influence of mind wandering seems to be confined to spatial and temporal factors that are content-free.

Email: James R. Brockmole, james.brockmole@nd.edu

3:10-3:25 PM (214)

Guided Search and the Functional Visual Field (FVF). JEREMY M. WOLFE and CHIA-CHIEN WU, Brigham & Women's Hospital-Harvard Medical School – In a visual search task, an observer, fixating at one point, is much more likely to find a nearby target than one far away. This eccentricity effect defines an FVF that will differ over search tasks. Models like Guided Search have tended to ignore the FVF. That is a mistake. Other models propose that search proceeds solely by parallel or ensemble processing within the FVF. That is probably wrong, too. For one thing, there may be more than one FVF in the same task. Think about a search for red "T"s among red and black "L"s. We propose one FVF defines the region within which attention would be serially deployed during a fixation. A different "guidance" FVF defines the region within which color can guide the next deployment of the eyes. New data and a more explicit model will be presented.

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Judgment and Decision Making II 520 C, Saturday Afternoon, 1:30-3:10 PM Chaired by Jessecae Marsh, Lehigh University

1:30-1:45 PM (215)

Making Bad Choices: The Influence of Causal Diagrams on Decision Making. JESSECAE K. MARSH, Lehigh University, MIN ZHENG, JEFFREY V. NICKERSON, and SAMANTHA KLEINBERG, Stevens Institute of Technology - Many machine learning methods have been introduced to extract causal relationships from complex real-world data. Ultimately these causal models are intended to guide real world decision-making. But do such graphical causal models actually help people make decisions? We investigated this question in the context of a domain often targeted by machine learning, namely health decisions. We asked participants to choose the optimal behavior for a given health decision either with or without the aid of a causal diagram that summarized contemporary scientific knowledge of different factors related to the health behavior. For a weight management decision, providing a diagram resulted in a smaller proportion of participants choosing the optimal behavior compared to the no diagram condition (Experiment 1). This effect was influenced by experience: participants without experience in a health domain (Type 2 diabetes [T2D]) produced more accurate decisions related to T2D when provided a causal diagram, while participants diagnosed with T2D were less accurate when provided a diagram (Experiment 2). Our findings suggest that providing causal information that conflicts with existing beliefs may interfere with people's decision-making ability.

Email: Jessecae Marsh, jessecae.marsh@lehigh.edu

1:50-2:05 PM (216)

Information Illusion: Placebic Information and Stock Price Estimates. MATTHIAS HORN and ANDREAS OEHLER, Bamberg University, STEFAN WENDT, Reykjavik University (Presented by Matthias Horn) - This study analyzes investors' perception of placebic information and its impact on stock price estimates. We initiate a questionnaire-based stock price forecast competition among 196 undergraduate students in business administration. We show that placebic information increases the perceived amount of relevant information. Individual participants' characteristics, such as gender, financial knowledge or overconfidence, do not affect these findings. Placebic information does not alter participants' stock price estimates and their accuracy, but it has an impact on individual expectations about the stock price forecast competition itself. The findings indicate that placebic information leads to information illusion, but this illusion does not seem to be detrimental, as it does not adversely affect participants' estimates and their accuracy. As reaction to the illusion, less overconfident investors decrease their expectations with regard to payoff and chances to win a prize in the competition. More overconfident participants do not show the latter behavior. Email: Andreas Oehler, andreas.oehler@uni-bamberg.de

2:10-2:25 PM (217)

What Type of Advice is Adopted When, and Benefits, Forecasting? DAVID V. BUDESCU and MARK HIMMELSTEIN, Fordham University - Past research suggests that, typically, forecasters prefer advice generated by humans rather than by algorithms. To better understand this pattern of source preference we ran two studies (n=250 each) involving forecasts of actual geopolitical events with various time horizons. After making a preliminary forecast, participants were shown an advisory forecast and given an opportunity to revise their judgments. The advisory forecasts were described as having been obtained from either human experts or statistical models. We found no preference for any source of advice, across all items, but most participants showed a preference for algorithmic advice for longer time horizons and human advice for shorter ones. Overall, people adjusted their forecasts in about 50% of the cases in the direction suggested by the advice. These adjustments were beneficial, as they systematically increased the accuracy of the forecasts. We develop a model predicting the propensity to revise forecast in light of advice. Email: David V Budescu, budescu@fordham.edu

2:30-2:45 PM (218)

Brain Stimulation of Right Dorso-Lateral Prefrontal Cortex Increases Cognitive Reflection Performance. VOLKER THOMA, University of East London, DANIEL EDGCUMBE, Newman College, Birmingham, MICHAEL NITSCHE, Technical University, Dortmund, DAVIDE RIVOLTA, University of Bari – Transcranial direct current stimulation (tDCS) was used to investigate whether stimulating the left or right dorsolateral pre-frontal cortex (DLPFC) compared to a sham group modulated performance on a number of judgment and thinking tasks. There were 3 tasks: vignettes assessing heuristic thinking, logic syllogisms, and the cognitive reflection test (CRT). Results showed that anodal tDCS to the right DLPFC was associated with an increase in cognitive reflection performance (Type 2 processing) as compared to left DLPFC and to sham (n = 18 in each group). Logic thinking was reduced following anodal tDCS to the left DLPFC. A second experiment confirmed these results for the right DLPFC, with single and once repeated stimulation also increasing performance in the CRT compared to sham (or repeated sham). Individual differences in cognitive ability and thinking style were controlled for and cannot account for these findings, which are broadly consistent with a dual process framework. The results demonstrate the involvement of the right DLPFC in cognitive reflection and suggest the possibility of improving judgment performance through tDCS. Email: Volker Thoma, vthoma@uel.ac.uk

2:50-3:05 PM (219)

Subjective Values Theory: The Economics of Human Lives. DALE J. COHEN, MONICA K. CAMPBELL, and AMANDA R. CROMLEY, University of North Carolina, Wilmington -Here, we proposed Subjective Values Theory: a precisely stated, mathematically instantiated, falsifiable model of how value drives preferential choice. Utility Theory, Prospect Theory, and traditional implementations of sequential sampling theory derive value from observers' preferential choices. Subjective Values Theory goes beyond these theories by (a) precisely defining and measuring value independent of preferential choice, and (b) using these independent measurements of value to a prior predict preferential choice. We instantiate the decision mechanism proposed by Subjective Values Theory in a new Robust Random Walk (RRW) procedure. Rather than estimate drift rate, the RRW takes the direct measurements of value as input and, using these measurements to drive drift, predicts participants' RTs and response choices. We evaluate the validity of Subjective Values Theory and the RRW in a series of experiments that measure the value of human lives and predict participants' reaction times and preferential choices in complex social decisions tasks.

Email: Dale J. Cohen, cohend@uncw.edu

Human Learning and Instruction II 520 B, Saturday Afternoon, 1:30-3:10 PM Chaired by Alice Healy, University of Colorado Boulder

1:30-1:45 PM (220)

Training, Retention, and Transfer of Data Entry Perceptual and Motor Processes Over Short and Long Retention Intervals. ALICE F. HEALY, University of Colorado, Boulder, JAMES A. KOLE, University of Northern Colorado, VIVIAN I. SCHNEIDER, University of Colorado, Boulder, IMMANUEL BARSHI, NASA, Ames Research Center – In two experiments, subjects trained in a standard data entry task, typing numbers (e.g., 2147) using their right hands. At an initial test (20 min or 6 months after training), subjects completed the standard task followed by a left-hand variant (typing with their left hands) involving the same perceptual, but different motoric, processes as the standard. At a second test (2 days or 8 months after training), subjects completed the standard task followed by a code variant (translating letters into digits, then typing the digits with their right hands) involving different perceptual, but the



same motoric, processes as the standard. At test, for each task, half the trials were trained numbers (old) and half were new. Repetition priming (faster responses to old than new numbers) was found for each task, with extended delays only slightly decreasing the magnitude of the effect. Repetition priming for the standard task reflects retention of trained numbers, for the left-hand variant transfer of perceptual processes, and for the code variant transfer of motoric processes. There was, thus, evidence for both specificity and generalizability of training data entry perceptual and motoric processes even over very long retention intervals.

Email: Alice F. Healy, alice.healy@colorado.edu

1:50-2:05 PM (221)

What Can Essay Response Scoring Tell Us About When Blocked Versus Interleaved Practice Will Be Beneficial? BRIDGID FINN, Educational Testing Service - Complex performance tasks, such as written essay responses, are used in numerous standardized assessment programs. The millions of essay responses that result from these assessments are primarily evaluated by human raters. Scoring test taker responses is a classification task: raters are presented with a series of unique essay responses and must identify which score category each new exemplar belongs to. The sequence in which information is presented during training can have a major impact on category learning and transfer test performance, with research suggesting that there are scenarios in which blocked and interleaved schedules can both be beneficial (e.g. Carvalho & Goldstone, 2019). What is the most effective way to sequence information during training of essay response scoring? Two experiments will investigate how blocked, interleaved and mixed training schedules impact the accuracy of essay scoring. Results will be discussed in the context of learning and classification theories. Email: Bridgid Finn, bfinn@ets.org

2:10-2:25 PM (222)

The Accuracy of Causal Learning Over 24 Days. BENJAMIN M. ROTTMAN and CIARA WILLETT, University of Pittsburgh (Presented by Benjamin Rottman) - Humans constantly use past experiences in long-term memory to guide decisions. In traditional lab-based experiments (e.g., causal learning, probability learning, etc.), the experiences are compressed into a successive series of learning trials. The rapid nature of this paradigm means that completing the task relies on working memory. In contrast, real-world events are typically spread out over longer periods of time, and therefore long-term memory must be used. We conducted a 24-day smartphone study to assess how well people learn causal relationships in extended timeframes. Participants learned about cases in which a cause and an effect were positively correlated, negatively correlated, or there was zero correlation. Surprisingly, we found few differences in causal learning when subjects observed a traditional rapid series of 24 trials as opposed to one trial per day for 24 days. Specifically, subjects were able to detect causality for positive and negative datasets and also exhibited illusory correlations in both the short-term and long-term designs. We will discuss potential learning mechanisms that can support probability learning over 24 days and evidence of episodic memories for the learned events.

Email: Benjamin Rottman, rottman@pitt.edu

2:30-2:45 PM (223)

Benefits for Everyone: Testing Enhances New Learning Independent of Learners' Working Memory Capacity and Age. BERNHARD PASTÖTTER, University of Trier, KARL-HEINZ T. BÄUML, Regensburg University, CHRISTIAN FRINGS, University of Trier - The forward testing effect (FTE) refers to the finding that retrieval practice of previously studied information enhances learning of subsequently studied other material. Three experiments were conducted that examined individual differences in the FTE. Participants studied three lists of items in anticipation of final recall testing. In the testing condition, participants were tested immediately on lists 1 and 2 after initial study, whereas in the restudy condition, they restudied lists 1 and 2. In both conditions, participants were tested immediately on list 3. The results of all three experiments showed an FTE, with interim testing of lists 1 and 2 enhancing list 3 recall. Additionally, the experiments showed that the FTE is (i) reliable in a test-retest design, (ii) unrelated to student learners' working memory capacity, and (iii) equally present in middle-aged and older adults. The findings suggest that the FTE affects learners at a wide range of cognitive abilities. Email: Bernhard Pastötter, pastoetter@uni-trier.de

2:50-3:05 PM (224)

Is the 'Learning from Errors' Benefit Due to Semantic Mediation or Episodic Recollection? JANET METCALFE and BARBIE J. HUELSER, Columbia University - Memory is enhanced when an error is committed and then corrected, as compared to when the answer is given without error generation. However, this seems to occur only when the errors are semantically related to the answer suggesting the Semantic Mediation Hypothesis. This seems at odds with the difficulty amnesics--who have spared semantic but impaired episodic memory--experience with errors. Accordingly, we tested whether the error-generation benefit in typicals was due to Semantic Mediation or to Episodic Recollection. In Experiment 1, we created Congruent (e.g., wrist-palm) and Incongruent (e.g., tree-palm) cues for target words (e.g., HAND). In the Congruent condition, participants generated errors that were semantically related to the target (e.g., finger). In the Incongruent condition they generated target-unrelated errors (e.g., coconut), which should not have provided a semantic mediator. Both conditions produced an error-generation benefit--contradicting the Semantic Mediation Hypothesis. Experiment 2 showed that the benefit only occurred when the error was also recollected on the final test. These results implicate episodic recollection rather than semantic mediation as the locus of 'learning from errors' benefit. Email: Janet Metcalfe, jm348@columbia.edu

Multisensory Perception 520 F, Saturday Afternoon, 1:30-3:10 PM Chaired by Pablo Gomez, DePaul University

1:30-1:45 PM (225)

Towards a Model of Tactile Attention. PABLO GOMEZ, ANA BACIERO, ISABEL URIBE, BRANDON ISLER, and AYANNA GUILLEN, DePaul University - In this short report, we present data from a set of three experiments in the tactile modality that aim to understand tactile perceptual decision making. In the first experiment, we asked participants to perform a simple numerosity judgment based on the number of pins that stimulated their index finger. The other experiments featured conflict tasks: a tactile version of Eriksen's flanker paradigm, and a tactile version of a Simon paradigm. We present evidence for the existence of a tactile flanker effect and a tactile Simon effect, and we interpret the data within the evidence accumulation tradition using drift-diffusion modeling. Interestingly, while the tactile versions of these effects share some commonalities with their visual counterparts, they also show some differences. For example, they occur in the absence of a percept, and in the absence of over-learned stimuli (letters are often used in visual flanker experiments). Based on our findings, we discuss some benchmarks for models of tactile perception and attention. Email: Pablo Gomez, pgomez1@depaul.edu

1:50-2:05 PM (226)

Effects of Audibility on Older Adults' Anxiety Towards Flying Quadrotors. RANXIAO FRANCES WANG, CHRISTOPHER WIDDOWSON, HYUNG-JIN YOON, and NAIRA HOVAKIMYAN, University of Illinois at Urbana-Champaign (Presented by Ranxiao Frances Wang) - Recent advances in autonomous robots have enabled the integration of flying quadrotors into human populated environments. A potential issue is people's comfort and perceived safety of these devices, especially for older adults who have less experience with new technologies. The present study examined the effects of audibility on older adults' anxiety toward flying robots comparing to younger adults. Participants were positioned at a three-way intersection in a virtual urban cityscape and passively observed quadrotors approaching from different directions while the presence of quadrotor flight noise was manipulated. A virtual quadcopter was modeled after a racing drone and highfidelity field recordings of a real drone were used as the basis for in-flight noise. Perceived safety was assessed as increased head acceleration/velocity away from the approaching quadcopter, coupled with increased electrodermal activity (arousal). The data showed greater arousal, head acceleration and head velocity overall for younger than older adults. However, both groups showed similar pattern of responses toward the quadrotor approaching and with respect to its audibility. Implications on using quadrotors for elderly care will be discussed. Email: Frances Wang, wang18@illinois.edu

2:10-2:25 PM (227)

Predicting Audiovisual Integration Capacity through Multiple Object Tracking, Orienting Attention, and Global Precedence in Perception. JONATHAN M.P. WILBIKS and ANNIKA BEATTEAY, University of New Brunswick Saint John - The capacities of unimodal processes such as visual and auditory working memory, multiple object tracking, and attention have been heavily researched in the psychological science literature. There has recently been an increase in work on audiovisual integration capacity, with findings showing that capacity modulates based on numerous unimodal and multimodal factors. I will present further work towards building a predictive model of audiovisual integration capacity based on individual differences in unimodal cognitive processes. An initial set of three experiments found that capacity measures correlate with multiple object tracking span, orienting attention, and global precedence in perception. A fourth experiment involved creating a predictive model of audiovisual integration capacity by employing each of the factors found to correlate with capacity. Taken together, these experiments represent the first effort to connect audiovisual integration capacity with unimodal processes, and reveals both the degree to which individual differences can be accounted for by these processes, as well as the amount of variation that may be owed to other, as yet untested processes, or those that are specific to audiovisual integration itself.

Email: Jonathan Wilbiks, jwilbiks@unb.ca

2:30-2:45 PM (228)

The Effect of Eye Disease, Cataract Removal and Hearing Aid Use on Multisensory Integration in Ageing. REBECCA J. HIRST, Trinity College Dublin, ANNALISA SETTI, University College Cork, ROSE ANNE KENNY and FIONA N. NEWELL, Trinity College Dublin - In this study, we assessed whether common age-related eye diseases (cataracts, glaucoma and age-related macular degeneration) and clinical intervention to improve sensory function (cataract removal and hearing aids) influence multisensory integration in ageing. Integration was assessed using the Sound-Induced Flash Illusion (SIFI), in which presenting one flash with two beeps results in the perception of two flashes. Eye disease and cataract removal did not significantly influence SIFI susceptibility. However, longterm hearing aid users (>4 years) were less susceptible to SIFI at short stimulus-onset asynchronies compared with short-term hearing aid users (<2 years) and controls. We interpret these findings as indicating poorer auditory temporal resolution in long-term hearing aid users, and therefore lower weighting of audition in multisensory perception. Future research should therefore investigate the impact of long-term hearing aid use on temporal acuity and associated multisensory processes. Email: Rebecca Hirst, HirstR@tcd.ie

2:50-3:05 PM (229)

Characterizing Dependency in the Time Window of Multisensory Integration Model. HANS COLONIUS, *University of Oldenburg*, ADELE DIEDERICH, *Jacobs University Bremen* – We investigate the structure of stochastic dependency between processing stages in the time-window model of multisensory integration (TWIN, Colonius & Diederich, 2004, *J Cog Neurosci*). According to the model, reaction time is an additive combination of two random variables, the first (peripheral) and second (central) stage processing times. Conditioning on the event of integration induces a binary mixture on this additive combination of two random variables. Without assuming parametric distributions, we derive explicit terms for the covariance and Kendall's tau between the stages using concepts from the statistical theory of copulas. It is shown that Kendall's tau may not be smaller than -1/2 and will equal zero whenever there is no effect of integration in either the first or second stage. Moreover, comparing processing times under integration with those without integration with respect to two stochastic order relations, the usual stochastic order and the likelihood ratio order, determines the sign of dependency. Our results are also relevant in the context of a controversy about the role of RT variability, specifically comparing the variance of reaction time to unimodal vs. multisensory stimuli. Email: Hans Colonius, hans.colonius@uni-oldenburg.de

Visual Search

520 B, Saturday Afternoon, 3:30-5:30 PM Chaired by Christian Olivers, Vrije Universiteit Amsterdam

3:30-3:45 PM (230)

Humans Can Efficiently Look For, but Not Select, Multiple Visual Targets. CHRISTIAN OLIVERS and EDUARD ORT, Vrije Universiteit Amsterdam, TUOMAS TEN CATE, Utrecht University, MARTIN EIMER, Birkbeck College London, JOHANNES FAHRENFORT, Vrije Universiteit Amsterdam -Can humans search for more than one target simultaneously? The answer depends on 1) whether observers can concurrently prepare and maintain multiple top-down templates for more than one target, and 2) whether those templates can then, in parallel, bias selection towards more than one target in the visual input. To disentangle these components, we measured electroencephalographic (EEG) responses while observers searched for two color-defined targets among distractors. Crucially, we varied the number of target colors that observers anticipated (thus determining the number of templates), and the number of colors used to actually distinguish the two targets present in the search display (thus determining the number of templates engaged in selection). Both behavior and multivariate classification of the EEG pattern revealed only a small cost associated with preparing multiple templates. In contrast, substantial costs arose when multiple templates had to be engaged in the actual selection of targets. Furthermore, the results indicate that this selection cost reflects limited parallel processing, rather than a serial bottleneck. The findings bridge diverging theoretical perspectives on capacity limitations of feature-based attention.

Email: Christian Olivers, c.n.l.olivers@vu.nl

3:50-4:05 PM (231)

Adding Distractors Leads to More Accurate Attentional Guidance in Dual-Target Search. KYLE R. CAVE, JAMES MCNAMARA, and JUNHA CHANG, University of Massachusetts, Amherst, NICK DONNELLY, Liverpool Hope University (Presented by Kyle Cave) – Although the eyes can be directed to targets very effectively in search for a single color, this guidance can be much less accurate in search for either of two colors. In our previous demonstrations of this dual-target cost, the search array consisted of ten items arranged in an

easily navigable circle. This new experiment compared search with these "sparse" arrays against search in "dense" arrays of 32 items packed more tightly together. The order of sparse and dense search was counterbalanced across subjects. The extra difficulty of dense search prompted subjects to employ more accurate guidance: distractors were generally fixated less often than with sparse arrays. Furthermore, subjects who started with dense search developed a habit of more accurate guidance that persisted when they switched to sparse search. Thus, attentional guidance depends on the number and/or the arrangement of items in the search array, and also on previous search experience.

Email: Kyle R. Cave, kcave@psych.umass.edu

4:10-4:25 PM (232)

Learned Distractor Rejection in the Face of Target Template Guidance. SHAUN P. VECERA and BRAD T. STILWELL, University of Iowa (Presented by Shaun Vecera) - Dominant accounts of visual search emphasize the efficient guidance of attention via a target template. The rejection of non-target distractors also contributes to efficient attentional guidance. For example, in learned distractor rejection, the repetition of a distractor allows that distractor to be suppressed, producing faster orienting toward the target. Can visual attention learn to ignore distractors in the face of strong target guidance? On the one hand, the ample evidence for the priority of target template guidance would suggest that template guidance dominates learned distractor rejection. On the other hand, findings that visual statistical learning occurs automatically and with little awareness would suggest that learned distractor rejection could operate alongside template guidance. In a series of experiments, we demonstrated that learned distractor rejection nevertheless occurred under trial-unique target cuing. Further, learned distractor rejection persisted in the face of valid spatial cues to the target. These findings suggest that distractor features are learned concurrently with attentional guidance via a target template or via spatial cues.

Email: Shaun Vecera, shaun-vecera@uiowa.edu

4:30-4:45 PM (233)

Target Frequency Affects the Functional Viewing Field. MEGAN H. PAPESH and JUAN D. GUEVARA PINTO, Louisiana State University (Presented by Megan Papesh) -During visual search, observers' functional viewing fields (FVF) shrink as target identification becomes more difficult. In the present study, we examined whether the FVF is similarly reduced during low-prevalence (LP) search, in which target identification is objectively more difficult than in high-prevalence (HP) search. Across multiple experiments, observers passively searched for targets in central Rapid Serial Visual Presentation (RSVP) streams, with target frequency manipulated across blocks (25%, 50%, and 75% target-present trials). Within each block, peripheral probes were infrequently presented at various eccentricities as observers monitored the central stream. Relative to the HP block, observers were more likely to detect and identify peripheral probes when targets appeared infrequently, revealing a negative relationship between FVF size and target frequency. We suggest that this relationship is the result of internal expectations developed throughout the search task: When observers expect to identify targets, they narrow their attentional focus.

Email: Megan Papesh, mpapesh@lsu.edu

4:50-5:05 PM (234)

Your Children and Your Parents are Not Optimal: Quitting Rules in Hybrid Foraging Over the Lifespan. BEATRIZ GIL-GÓMEZ DE LIAÑO, BWH-Harvard Medical School-Cambridge University-UAM, IRIS WIEGAND, Max Planck UCL, JEREMY M. WOLFE, BWH-Harvard Medical School - In hybrid foraging, observers search for multiple instances of multiple types of targets (e.g., find red LEGO bricks, green roof pieces, and yellow corner pieces). A critical parameter in foraging is the "patch leaving time", when observers stop collecting from one patch or LEGO pile, and move to the next. Charnov's Marginal Value Theorem (MVT; Charnov, 1976) states that an optimal observer should leave the search when the rate of collection drops below their average collection rate. In the present studies, we compared patch-leaving time for children, younger and older adults using hybrid search paradigms from Wolfe et al. (2016, 2019). Young adults are roughly optimal. Children (4-10) follow a "giving up rule", leaving the search too early, while older adults follow a "don't waste rule" leaving too late. In addition to U-shaped life-span functions for reaction time and accuracy, we appear to become more 'conservative' foragers as we age.

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5:10-5:25 PM (235)

A Unified Account of Repetition Blindness and the Attentional Blink. DAVID E. HUBER, University of Massachusetts, Amherst, LUCAS D. HUSZAR, New York University (Presented by David Huber) - The perceptual wink model of Rusconi and Huber (2018) assumes that the Attentional Blink (AB) is a perceptual deficit, reflecting a failure to perceive that the second target belongs to the target category. Providing a unified account of the AB and Repetition Blindness (RB), we augmented the perceptual wink model with a Bayesian decision process that compares the accumulated evidence in short-term memory against expected levels to determine how many times a particular identity appeared. We assessed the model with three combined AB/RB RSVP experiments using the paradigm of Chun (1997), while manipulating category mapping; for each experiment, one group of subjects received consistent mapping, with a set of characters consistently assigned to the target category, while another group received varied mapping, with variation across trials for the target category. As predicted, the category mapping manipulation affected RB and the AB in a similar manner. Multiple-choice testing was used to confirm the prediction that in the midst of both the AB and RB, participants would claim that the trial only contained one target, as expected if both deficits reflect a failure to perceive that the second target belonged to the target category.

Email: David Huber, dehuber@psych.umass.edu

Discourse Processes II 520 C, Saturday Afternoon, 3:30-5:30 PM Chaired by Johanna Kaakinen, University of Turku

3:30-3:45 PM (236)

Eye Movements Reflect Emotional Arousal and Transportation During Reading of Literary Texts. JOHANNA K. KAAKINEN, University of Turku - This study examined how the emotional experience induced by fictional narratives is reflected in readers' eye movements. Participants (N=40) read 24 excerpts from Stephen King short stories while their eye movements were recorded. After reading, participants rated the emotional valence and arousal induced by each text with SAM (Bradley & Lang, 1994) and filled the transportation scale short form (Appel, Gnambs, Richter & Green, 2015). The results showed that negatively valenced texts induced higher arousal and transportation than more neutral or positive texts. High arousal was associated with longer total reading times, higher number of fixations and greater pupil dilation during reading, whereas high transportation was related to shorter total reading times, fewer fixations and smaller pupil size. The present results demonstrate that eye movements are sensitive to the emotional reaction of the reader and reflect the experienced transportation to the story world.

Email: Johanna K. Kaakinen, johkaa@utu.fi

3:50-4:05 PM (237)

The Representation of Emotion Inferences in Long-term Memory. RICHARD J. GERRIG and MICAH L. MUMPER, Stony Brook University (Presented by Richard Gerrig) -Researchers have argued that readers infer characters' emotions. However, extant evidence does not indicate whether those inferences are encoded into long-term memory or whether they are bound to particular characters. To address these issues, we had participants read sentence-long stories that allowed ready emotion inferences. Compared to performance on control stories, participants took longer to reject the implied emotion term in an immediate paradigm (Experiment 1) and were less accurate in a delayed recognition paradigm (Experiment 2). In Experiment 3, we primed participants in a delayed recognition paradigm with the name of the character who experienced the emotion or a secondary character who did not. Participants were less accurate to reject the implied emotion term when primed by both character names. These results suggest that readers encode emotion inferences into long memory, but that those emotions may not be specifically bound to the character whose actions or experiences prompted the inference. Email: Richard Gerrig, richard.gerrig@stonybrook.edu

4:10-4:25 PM (238)

Preschoolers' Attention to Emotional Prosody: Pragmatic Adjustment in Response to Speaker Conventionality. CRAIG G. CHAMBERS, *University of Toronto*, JUSTINE THACKER and SUSAN A. GRAHAM, *University of Calgary* (Presented by Craig Chambers) – To what extent is language processing guided by contextual and social inferencing versus learned cooccurrences? To explore this question, we examined how child listeners adjust their sensitivity to emotional prosody as a function of speaker conventionality. In Experiment 1, preschoolers were introduced to one of two speakers: a conventional speaker who demonstrated a match between linguistic content and emotional prosody, or a speaker with mismatching emotional prosody. We then assessed how the preschoolers used emotional prosody to guide their processing of subsequent language produced by the speaker. Experiments 2–4 manipulated whether the speaker was explicitly identified as atypical initially, and the degree to which their unconventionality was related to emotions. The findings revealed highly context-driven effects, with distinct types of speaker unconventionality disrupting children's use of emotional prosody differently, as well as changes across 4- and 5-year-olds with respect to how speaker evaluations reweight emotional prosody cues.

Email: Justine Thacker, jthacker@ucalgary.ca

4:30-4:45 PM (239)

Where Sentence Processing Meets Conversational Repair: Unpredicted Utterances Exacerbate Comprehension Difficulties. JULIA MERTENS and JAN PETER DE RUITER, Tufts University - Interlocutors initiate repair, or flag comprehension problems (e.g., "Who?" "What?"), approximately once every 84 seconds of conversation. In sentence processing studies, unpredicted words require cognitive repair. Do unpredicted speech acts influence repair initiations? The typical Floor Transfer Offset (FTO), or time between utterances, is under one second; after this cutoff, utterances are considered disjointed from the prior turn. Therefore, we considered trouble sources after a 1.5 second gap as relatively context-free. We predicted that repair initiations after context-free trouble sources would be (1) delayed and (2) 'open,' class, or marking larger problems (e.g., "Sorry?"). Out of 458 repair initiations from natural conversation, 86 (18.8%) trouble sources were context-free. A Bayesian Mann-Whitney U test found very strong evidence FTOs after context-free trouble sources were about 340ms longer (BF₁₀ = 37.9). Further, a Bayesian contingency table found moderate evidence that 'open' class repair initiations followed more context-free trouble sources (BF₁₀ = 3.14). Conversational turns with limited context are more difficult to process in conversation, and lead to more frequent 'open' initiation of repair.

Email: Julia Mertens, julia.mertens@tufts.edu

4:50-5:05 PM (240)

Repetition Priming Effects in the Interpretation of Discourse

Relations. EYAL SAGI, *University of Saint Francis* – Many linguistic theories of discourse structure rely on the idea that the segments comprising the discourse are linked through inferred relations, such as causality and temporal contiguity. These theories suggest readers rely on information found in the text to identify the relevant relation, together with the application of world knowledge. I will present results that demonstrate repetition priming effects in the interpretation and identification of discourse relations. These results support the cognitive utility and validity of such relations. More interestingly, the results suggest that reading comprehension is influenced by cognitive factors beyond world knowledge and the text itself.

Email: Eyal Sagi, esagi@stfrancis.edu

5:10-5:25 PM (241)

Funding at the National Science Foundation: Increasing Your Chances of Success. BETTY TULLER, *National Science Foundation* – This presentation and Q&A session will provide information on applying for National Science Foundation (NSF) funding. Program officers will discuss current funding opportunities relevant to the psychonomics community, NSF merit criteria, and the review process. We will review how planning now may help your chances in the future. Email: Betty Tuller, btuller@nsf.gov

Judgment

520 F, Saturday Afternoon, 3:30-5:30 PM

Chaired by Richard Anderson, Bowling Green State University

3:30-3:45 PM (242)

Bayesian Inference with Graphical and Non-Graphical Information Formats. RICHARD ANDERSON, Bowling Green State University, LAURA MARIE LEVENTHAL, The University of Findlay, SAMUEL D. JAFFEE, Google - An experiment investigated judgments of probability under conditions in which the information format was either graphical (in the form of a circular display), or numerical (in the form of probabilities or frequencies). The design also included an orthogonal manipulation of the correct answer ("70%," "50%," or "30%") and base rates (70:30, 50:50, or 30:70). Performance was surprisingly similar across information formats, despite the fact that the graphical problems could, in principle, be solved correctly without attending to base rates. However, there were complex, significant interactions among the aforementioned factors, as well as among variables such as numeracy competence. Of particular note is that for the numerical frequency format, the mean absolute error was especially high when the correct answer was "50%." Overall, the results question the generality of previous claims that a frequency format is superior to a probability format, and show that, while people's importance ratings suggested that they understood which parts of the graphical presentation were important for making their probability judgments, such knowledge did not create a clear performance advantage for graphical as opposed to numerical presentation.

Email: Richard Anderson, randers@bgsu.edu

3:50-4:05 PM (243)

Updating Judgement Contexts with Extreme Stimuli. SIMON FARRELL, *University of Western Australia*, GRETA FASTRICH, *University of Reading* – A number of theories assume that objects are not judged in isolation but are compared to other objects. In many experiments the context is the objects seen in the experiment; for example, if judging the size of squares, the judgement context would be the set of all (or some of) the squares seen so far in the experiment. We ask what happens when an extreme stimulus is only occasionally presented. Does it enter into the judgement context, or is it effectively discounted? Across two experiments involving magnitude judgements on squares and numbers, we find little effect of the outlier on following judgements. Nonetheless, we show that people used the experiment context to form their judgements, by showing sensitivity to the skew of the distributions. Fitting two models of context-based judgement – Parducci's range-frequency theory, and Haubensak's consistency model – suggests the combined effects of overall context and individual items is challenging and requires a process to account for the discounting of extreme events.

Email: Simon Farrell, simon.farrell@uwa.edu.au

4:10-4:25 PM (244)

Context Effects on Tempo Perception and Reproduction. DOUGLAS H. WEDELL, WILLIAM M. HAYES, and MATTHEW A. RASHOTTE, University of South Carolina -The fact that people can sing familiar songs from memory at the correct tempo has been used to support the hypothesis that they encode absolute tempo in memory. However, perceptual judgments reveal strong systematic assimilative biases in memory for tempo after listening to faster or slower contextual versions of the song. Experiment 1 demonstrated that this contextual manipulation did not significantly alter reproduction of the original tempo in a tapping task, supporting the absolute tempo hypothesis in reproduction. Experiment 2 further supported a dissociation of perception and reproduction as participants showed large contextual assimilation effects in perceptual judgments but no contextual effects in reproduction. However, Experiment 3 demonstrated that when contextual tempos were reproduced on each trial, rather than simply listened to, there was a significant assimilative bias in subsequent reproduction of the original tempo. These results support the modality specific nature of contextual effects on tempo memory. Email: Douglas H. Wedell, Wedell@sc.edu

4:30-4:45 PM (245)

Facts Context Judgment. STEPHEN W. LINK, McMaster University - The theory of sequential comparative judgment postulates that comparative differences between a stimulus and an Effective Standard accumulate over time until either of two thresholds is reached. Then a judgment has occurred. This theory (Link, 1975,1992) provides a new interpretation of how context influences the standard used by the subject making a comparative judgment. Applied to a classic experiment, the theory shows the Effective Standard to depend upon the context in such a way as to invalidate the basic assumptions in the law of comparative judgment, signal detection theory and other theories that fail to allow for a "subjective" standard. By estimating the Effective Standards used as a basis for judgments, the sequential theory yields predictions of choice probabilities very close to the experimentally determined probabilities and reveals a shocking change in Effective Standards. Email: Stephen W Link, slink@ucsd.edu

4:50-5:05 PM (246)

Collective Intelligence in Perceptual Decision Making. JASON TANGEN, *The University of Queensland*, RACHEL A. SEARSTON, *The University of Adelaide*, KIRSTY KENT, *The University of Queensland* – Collective intelligence methods have been used previously to successfully diagnose skin lesions (Kurvers et al, 2005), interpret mammograms (Wolf et al, 2015), diagnose patients in emergency medicine (Kämmer et al, 2017), and recognise unfamiliar faces (Phillips et al, 2018). It is clear from these findings that there's great potential for collective intelligence in forensic decision making given the similarity of these domains. We presented 36 professional fingerprint examiners and 36 novices with matching and nonmatching prints and applied a variety of aggregation rules to their judgements. Following the classic "wisdom of the crowd" effect, both groups exhibited a sharp increase in discrimination with a crowd of three, but even the wisest novice crowd made a substantial number of false alarms, and they paled in comparison to professionals. Crowds of novices became more liberal as they grew, increasing both hits and false alarms, while crowds of experts became more conservative, slightly increasing hits and eliminating false alarms altogether. Combining independent judgements works well for distinguishing matching and nonmatching fingerprints, but only for crowds of experts. Email: Jason Tangen, uqjtange@uq.edu.au

5:10-5:25 PM (247)

Do Demand Characteristics Play a Role in the Minimal Group Paradigm? HILARY BARTH, KERRY BREW, TAYLAR CLARK, and JORDAN FEINGOLD-LINK, Wesleyan University (Presented by Hilary Barth) - In minimal group (MG) studies, ingroup bias is thought to come from mere group membership. We asked whether demand characteristics in MG designs might lead participants to favor ingroups. 160 Children aged 4-6 years were randomly assigned to a typical MG condition (assignment to a green or orange group, then completion of 3 bias measures using questions about photos of children wearing green or orange) or a closely matched no-group condition that retained the salient green or orange object with no group assignment. Bias toward color-match individuals in the no-group condition would suggest demand characteristics in MG studies contribute to appearances of ingroup bias. Three main findings emerged from this preregistered study. First, there was ingroup bias for only 1 of the 3 measures in the group condition. Second, the photos in this measure varied in race/ethnicity across trials, yet children still showed minimal ingroup bias. Third, participants in the corresponding no-group condition showed no colormatch bias. This supports the view that mere membership in a group leads to ingroup bias, and suggests that the design of minimal group studies does not lead participants to prefer color-match individuals.

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Recognition Memory II

518 A, Saturday Afternoon, 3:50-5:30 PM

Chaired by Barbara Knowlton, University of California, Los Angeles

3:50-4:05 PM (248)

Strategic and Automatic Encoding Effects in Value-Directed Remembering. BARBARA J. KNOWLTON and JULIA SCHORN, University of California, Los Angeles, JOSEPH HENNESSEE, University of Texas at Dallas, TARA K. PATTERSON and ALAN D. CASTEL, University of California, Los Angeles (Presented by Barbara Knowlton) – High-value items are often remembered better than low-value items, but
the contribution of strategic vs. automatic effects of value are still unclear. Here, we examined whether value effects would be obtained when encoding strategies were controlled for value. Participants studied words with different point values and were instructed to generate a sentence containing each item or to list the consonants. Value effects on a subsequent recognition test were substantially reduced when encoding strategy was controlled compared to performance of a second group that was free to encode items as they wished. However, there was still a small but significant memory advantage for high-value words when encoding strategy was controlled. These results support the idea that subjects strategically apply more effective encoding strategies for high value items, leading to better memory for them. However, our results also suggest that value may automatically strengthen memory to some degree, regardless of encoding strategy.

Email: Barbara J. Knowlton, knowlton@psych.ucla.edu

4:10-4:25 PM (249)

Effects of Reward Motivation on Memory Sensitivity and Response Bias. HOLLY J. BOWEN, Southern Methodist University, MICHELLE L. MARCHESI and ELIZABETH A. KENSINGER, Boston College - Studies of reward-motivated memory report higher hit rates for high-reward compared to low-reward items, but generally hit rate is the only memory measure as previous paradigms produce only a single false alarm rate. It is possible high-reward items have higher hit rates because participants are more willing to endorse those items as "old". Other measures, like sensitivity and response bias, are overlooked when there is a single false alarm rate, but we hypothesize these are also susceptible to reward manipulations. To test whether reward influences other measures, we created a novel paradigm that allows separate hit and false rates at each reward level, also varying penalty values for false alarms. We replicated prior findings of higher hit rates for high compared to low-reward items, but when false alarm rates were included to calculate d', we found no difference in memory sensitivity. Across the three experiments we found response bias was more conservative for low-reward items, indicating participants were more likely to endorse a "new" response to this category of items compared to high-reward. In sum, reward influences memory, but also biases independent of sensitivity. Email: Holly bowen, hbowen@smu.edu

4:30-4:45 PM (250)

Modelling Positive and Negative Confidence-Accuracy Relationships in 2AFC and Single-Probe Judgment Tasks. PHILIP A. HIGHAM, *University of Southampton* – Confidenceaccuracy relationships in memory tasks are normally positive, but they can be negative for so-called deceptive items that produce high-confidence errors. Various theories have been developed over the years to explain this dissociation in both 2AFC and single-probe judgment tasks. In this talk, I will present two simple, related models that explain both types of dissociation with very few assumptions. For the 2AFC version, the model assumes that decisions are made by comparing the metacognitive strength of the two items whereas confidence is based on the size of the discrepancy. For single-probe tasks, decisions are made by assessing the metacognitive strength of the probe with respect to a decision criterion whereas confidence is based on the discrepancy between the probe and the criterion. Simulations indicate that these models not only explain the confidence-accuracy dissociations, but they also account for a number of other aspects of the data as well. Email: Philip A. Higham, higham@soton.ac.uk

4:50-5:05 PM (251)

Outsourcing in Recognition Decisions is Infrequent but Effective. GREGORY KOOP, KATE KAUFFMAN, and ANDY KING, Eastern Mennonite University - Over the course of the memory retrieval process, individuals may receive additional information about the to-be-retrieved episode. At times, this additional information harms memory accuracy. In these situations, individuals add or adapt details that were suggested by post-episode information. However, there are also occasions when individuals use post-event information effectively. For example, individuals may only integrate external information when their memory quality is poor. If the external source is at least somewhat reliable, this "low-confidence outsourcing" can improve memory performance. The present work uses a process-tracing methodology to examine the conditions under which individuals seek out additional memory recommendations and how that information is then integrated into recognition decisions. In two single-item recognition studies we demonstrate that individuals can benefit from external memory recommendations, but that they seek out this additional information on surprisingly few trials. Thus, rather than seeking out additional information and integrating it into every recognition decision, the benefit of these external recommendations is primarily seen on trials where participants have poorer memory.

Email: Gregory Koop, gregory.koop@emu.edu

5:10-5:25 PM (252)

Effects of Stimulus Similarity and Speed versus Accuracy Instructions on Recognition Memory. MOLLY BETTIS MORELAND, Hood College - Similarity between test items differentially affects recognition memory performance. Tulving (1981) originally found higher accuracy on similar (related) test pairs (A-A') relative to dissimilar pairs (A-B') where B' is similar to a studied but untested item. More recently, Moreland and Clark (2019) showed that the A-A' accuracy advantage was more pronounced for responses made with faster reaction times. In the present study, participants were instructed to respond as quickly or as accurately as possible on A-A' and A-B' test pairs. On accuracy trials, participants exhibited higher accuracy and longer reaction times on A-B' compared to A-A' pairs, consistent with an elimination, or possibly, a recall-to-rejectlike process (Rotello & Heit, 2000). On speed trials, reaction times decreased and participants exhibited a small but stable A-A' accuracy advantage. The similarity relations of test stimuli may induce different memory strategies, qualified by the task context-whether one is focused on speed or accuracy. Email: Molly Moreland, moreland@hood.edu

Working Memory: Neural Mechanisms and Individual Differences

520 A, Saturday Afternoon, 3:50-5:30 PM *Chaired by Geoff Woodman, Vanderbilt University*

3:50-4:05 PM (253)

The Contralateral Delay Activity Tracks the Storage of Objects in Working Memory while Alpha Activity Tracks the Focus of Attention. GEOFFREY F. WOODMAN, Vanderbilt University, SISI WANG, East China Normal University, JASON RAJSIC, University of Northumbria (Presented by Geoffrey Woodman) - The contralateral delay activity (CDA) is an eventrelated potential that is generally believed to be a neural index of working memory storage. However, several recent studies have suggested that the suppression of alpha band activity may provide a redundant index of working memory storage. Here we used the sequential presentation of memoranda to dissociate these two neurophysiological measures. If the CDA or alpha activity is measuring working memory storage, then it should increase in magnitude with the presentation of each tobe-remembered object. In contrast, if either of these metrics is actually measuring the focus of attention, then it should remain constant because each array has just one object that needs to be selected. The amplitude of CDA increased with each item that subjects needed to store in VWM, but alpha band activity was the same amplitude for each object in the sequence. These findings show that alpha-band activity measures a mechanism of attentional selection and the CDA measures a mechanism of working memory storage, opening up new avenues for testing cognitive models with these complimentary tools.

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4:10-4:25 PM (254)

Working Memory Capacity Differences Based on the Resting State Brain Networks: An fMRI Study. MARIKO OSAKA, MIZUKI KANEDA, and MIYUKI AZUMA, NICT, KEN YAOI, Kanazawa University, TETSUYA SHIMOKAWA, NICT, NAOYUKI OSAKA, Kyoto University - Resting state networks were compared between high and low working memory (WM) capacity groups. Group differences of WM capacity were estimated by reading span test (RST) measured outside fMRI scanner and participants were divided into high and low WM capacity groups based on the RST estimates. FMRI activations were measured while participants were resting state with eyes closed for eight minutes. Using CONN software, we analyzed four networks: Default-Mode (DMN), Salience, Dorsal Attention and Fronto Parietal (FPN). Results showed that significant group differences were found between medial prefrontal cortex (DMN) and posterior parietal cortex (FPN). The correlations between the two regions were higher in high capacity group than low capacity group. These findings suggest that group differences of WM are based on network strength of DMN and attention control networks, which shows high capacity group is ready for execution of executive function even while resting state.

Email: Mariko Osaka, mosaka@hus.osaka-u.ac.jp

4:30-4:45 PM (255)

Neuroimaging Evidence for a Dedicated Phonological WM Buffer. RANDI C. MARTIN, Rice University, QIUHAI YUE, Vanderbilt University (Presented by Randi Martin) - The embedded processes approach argues that working memory (WM) consists of the activated portion of long-term memory, including a limited number of items in the focus of attention. Recent neuroimaging evidence argues instead for a dedicated phonological buffer, showing that the left supramarginal gyrus (SMG), which is separate from the speech processing region (superior temporal gyrus, STG), supports phonological WM (Yue, Martin, Hamilton, & Rose, 2018). Follow-up experiments showed that during the delay period of a WM task, phonological representations could be decoded using representational similarity analysis in the SMG but not the STG for word stimuli. With nonwords, the STG showed decoding evidence but not if distractors were present whereas the SMG showed such evidence even with distractors present. Furthermore, transcranial magnetic stimulation in the SMG during the delay disrupted performance whereas stimulation in the STG did not. Together the results provide strong evidence for a dedicated buffer account.

Email: Randi C Martin, rmartin@rice.edu

4:50-5:05 PM (256)

Memory for Nonverbal Serial Order Moderates Language Development in Sequentially Bilingual Children with Developmental Language Disorder. ELISABET SERVICE, McMaster University, PEKKA LAHTI-NUUTTILA, University of Helsinki, SARI KUNNARI, University of Oulu, SINI SMOLANDER, EVA ARKKILA, and MARJA LAASONEN, Helsinki University Hospital - Phonological short-term memory (STM) has been linked to developmental language disorder (DLD) and dyslexia in many studies. We explore what role non-phonological memory for temporal order plays in DLD. Previously, we reported on a study of 4-6-year old Finnish children with DLD and typically developing (TD) controls. Serial STM had no effect on accumulating language skills in TD children but seemed to constrain language development in DLD. Here we describe how immigrant children's second language (L2) acquisition depends on serial memory. We replicated the pattern of order memory modulation of language development with age in DLD but not TD. Similar modulation was not significant for language acquisition in DLD with accumulating exposure. We speculate that atypically developing domain-general serial STM capacity can delay or constrain early language acquisition. The effect of hours of exposure appears partly independent of this effect, possibly relying on statistical mechanisms.

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5:10-5:25 PM (257)

What Causes Forgetting in Short-Term Memory in the Absence of Maintenance? GAEN SARAH PLANCHER and LISON FANUEL, *University of Lyon*, SAM HARDING and RICHARD SHIFFRIN, *Indiana University* – The present study investigated the role of similarity of interfering material when maintaining information in short-term memory. Five consonants were visually presented for later recall. After

presentation and before the recall, participants carried out different tasks requiring binary discriminations, each of 40-seconds duration, and each presented in continuous noise. Noise level was constantly modulated in an attempt to equalize task difficulty across participants and tasks. The similarity between the discrimination task and the visually presented consonants was varied: the discriminations were visual or auditory and were verbal or non-verbal. Memory performance was not influenced by similarity for three of the intervening tasks but was lower for the auditory verbal task (a task more difficult than the others). Memory performance may have decreased in that condition either because the auditory verbal task is similar to the way consonants were coded, as a phonemic temporal string, or because it fully occupied attention. Another experiment using spatial memoranda to prevent phonologic maintenance is under progress.

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Reading

519 B, Saturday Afternoon, 3:50-5:30 PM *Chaired by Steven Luke, Brigham Young University*

3:50-4:05 PM (258)

What Can Empty Mixed-Effects Models Tell Us About Eye-Movement Variance During Reading? STEVEN G. LUKE, Brigham Young University - A primary goal of scientific research is to explain variance - to account for apparently random fluctuations in some variable. When people read, there is significant variability in eye movements. Variance explained by between-reader and between-word differences in reading was quantified using empty mixed-effect models (random byparticipant and/or by-word intercepts but no fixed effects). Across multiple data sets, between-reader differences explained 6-9% of reading-time variance, between-word differences explained 5% (FFD) to 17% (TT) of variance, and context explained an additional 7%. Reader and word/context variance was additive. Remaining variance (~74% across measures) was random. At the text level, between-reader differences explained 63% (FFD) to 53% (TT) of variance, while betweentext differences explained 4-12%. Saccade amplitude variance was explained well by between-word differences (48%), not between-reader differences (1.6%). Results indicate that models of reading should treat when and where processes separately, incorporate individual differences, and focus on aggregate reading time measures.

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4:10-4:25 PM (259)

The Role of Look-Backs in Processing Written Sarcasm. HENRI OLKONIEMI, EERIKA JOHANDER, and JOHANNA K. KAAKINEN, *University of Turku* – Previous eye-tracking studies suggest that when resolving the meaning of a sarcastic statement in text, readers often return to the statement from subsequent text parts. We used a modified trailing mask paradigm to examine the role of these look-back fixations in sarcasm comprehension, and whether there are individual differences in how readers resolve sarcasm. Sixty-two participants read paragraphs containing either a literal or a sarcastic utterance while their eye movements were recorded. Text was initially masked with a string of x's and sentences were revealed one at a time. In the normal reading condition, sentences remained visible when the reader moved on to the next sentence; in the masked condition, the sentences were replaced with a mask. Individual differences in working memory capacity (WMC) were measured. The results showed that readers adjusted their reading behaviour when a mask prevented them from re-examining the text content. Interestingly, the readers' compensatory strategies depended on spatial WMC. The present study suggests that look-backs are driven by a need to re-examine the text contents but that they are not necessary for successful sarcasm comprehension. Email: Henri Olkoniemi, henri.olkoniemi@utu.fi

4:30-4:45 PM (260)

Does Aging Affect the Depth of Processing of Parafoveal Words? SALLY ANDREWS, AARON VELDRE, and ROSLYN WONG, University of Sydney - Recent gaze-contingent eye movement studies of young adults have demonstrated preview benefits for parafoveal words that are plausible continuations of the sentence, regardless of their semantic or orthographic relatedness to the target word, even in constraining sentences that strongly predict a different word. This study investigated whether sensitivity to the contextual plausibility of parafoveal previews extends to older readers. Eye movements of 65 cognitively intact older participants (60-88) were recorded as they read sentences containing highly predictable or unpredictable target words, which were replaced by identical, plausible or implausible previews until the reader fixated on the target word location. Paralleling the young adult data, a plausibility preview benefit was observed on first-pass fixations, even for highly predictable targets, but older readers did not show the benefit of preview predictability on skipping that was observed in young adults. The implications for understanding the effects of aging on reading will be discussed. Email: Sally Andrews, sally.andrews@sydney.edu.au

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4:50-5:05 PM (261)

Effects of Word Exposure on Sentence Reading Time. ATHANASSIOS PROTOPAPAS, SIETSKE VAN VIERSEN, and LAOURA ZIAKA, University of Oslo, RAUNO PARRILA, Macquarie University, PETER F. DE JONG, University of Amsterdam, GEORGE K. GEORGIOU, University of Alberta - What is the effect of repeatedly encountering a word? Eye tracking studies show a reduction in viewing time and better post-test recognition. Familiarization is thought to drive more efficient processing of the target word itself, but not much is known about processing the sentence that contains it. In this study, Dutch children in Grades 2 and 5 (N=81 and 59) read aloud sentences containing target items (words or pseudowords, 1 or 2 syllables long). Items were repeated six times, in different sentences, randomly paired. Sentence reading times were analyzed with generalized additive mixedeffects models including fixed effects of target viewing time, preceding and following item viewing time, trial (to capture long-term session trends), target repetition, plus crossed random effects of participants, target items, and sentences. As expected, target (as well as N-1 and N+1) viewing times were

reduced with repetition and were strongly associated with sentence reading times. However, there was an additional effect of target repetition on sentence reading beyond item viewing times, significant across grades and targets. This suggests that familiarization with a word confers non-local processing advantages in sentence-level integration.

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5:10-5:25 PM (262)

Towards Complete Model a of Reading. ERIK D. REICHLE, Macquarie University Computational models have been developed to explain the cognitive processes involved in reading, including word identification (e.g., Perry et al., 2007), sentence processing (e.g., Lewis & Vasishth, 2005), the representation of discourse (e.g., Frank et al., 2003), and how these processes interact with the systems that guide the eyes and attention during reading (e.g., Reichle et al., 2012). In this talk, I will describe my efforts to develop a more comprehensive description of reading by embedding models of word-identification, sentence-processing, and discourse- representation within the framework of the E-Z Reader model of eve-movement control during reading (Reichle, 2019). The goal of this work is to develop a framework for simulating on- and off-line behaviors during reading (e.g., the patterns of eye movements made during reading, the content of the text later remembered, etc.), and by doing this, to gain a better understanding of reading in its entirety. Email: Erik D. Reichle, erik.reichle@mq.edu.au

Attention to Features and Objects 519 A, Sunday Morning, 8:00-10:00 AM Chaired by David Anaki, Bar-Ilan University

8:00-8:15 AM (264)

The Role of Spatial attention in Holistic Processing of Faces: Evidence from Neglect Patients. DAVID ANAKI, Bar-Ilan University - Faces have biological and social significance. As such, faces are perceived automatically but also recruit attention. We examined the interaction between face perception and attention in individuals suffering from left unilateral neglect. Patients and matched controls participated in 2 experiments: In the chimeric task they saw 3 vertically-presented faces. The original face appeared in the middle. The faces above or below were faces, composed of either the left- or right side of the original face. Participants judged which of the two faces is more similar to the middle face. In the inversion effect task participants saw an upright or inverted full face. Then, a left- or right-side half face appeared. Participants judged whether the half-face is the same as the previous full face. Neglect patients showed a rightward perceptual bias in the chimeric task. In the inversion effect task controls showed an inversion effect for both types of faces. Neglect patients showed an inversion effect only for the right-side half faces. These results highlight the importance of intact spatial attention in face perception. Damage to spatial attention mechanisms impairs holistic face processing in the contralateral side of the injured hemisphere. Email: david anaki, david.anaki@biu.ac.il

8:20-8:35 AM (265)

Modulation of Holistic Face Processing by Probabilistic Learning: Support for an Attentional Account. KIM M. CURBY and MADALINE KINLAY, Macquarie University - Traditional accounts of holistic face processing emphasize template-based mechanisms and the importance of the prototypical face configuration. More recently, holistic processing has been re-framed as an attentional strategy, with holistic processing hallmarks like the composite effect reflecting a failure of selective attention. Consistent with this account, holistic processing is impacted by training of different attentional prioritization patterns. We probed attentional accounts of holistic processing by manipulating, within the composite face task, the probability that the task-irrelevant face part would contain task-congruent or -incongruent information. Attentional holistic processing accounts would predict attenuated holistic processing when the probability of the task-irrelevant part containing congruent information is low (25%) compared to when it is high (75%). In contrast, templatebased holistic processing accounts would predict that holistic processing would be unaffected by this manipulation. Our data revealed attenuated holistic processing when the task-irrelevant part infrequently contained congruent information, thereby supporting an attentional account of holistic face processing. Email: Kim Curby, kim.curby@mq.edu.au

8:40-8:55 AM (266)

Object Effects: Object-Based Attention or the Cost of Attentional Shift Across a Non-Uniform Region? ZHE CHEN and DEEPTANSHU BASU, University of Canterbury, KYLE R. CAVE, University of Massachusetts, Amherst, SWETA SURESH and JONATHAN WILTSHIRE, University of Canterbury -Chen and Cave (2019) show that the one-object advantage in visual comparison tasks that had previously been attributed to object-based attention can be explained in terms of facilitation in responding to horizontally rather than vertically configured targets. In this study, we investigate the degree to which object effects can be explained by the cost in attentional shift across a non-uniform region. Participants responded to two sequentially presented targets or a target following a spatial cue. The region between the stimuli was either uniform or non-uniform, and in the latter case, the stimuli were in the same object or in different objects. Response latencies were influenced primarily by the uniformity of the region between the stimuli, suggesting that the object effects in previous spatial cuing studies may be caused largely by the cost in attentional shift across a non-uniform region rather than by object-based guidance of attention. Email: Zhe Chen, zhe.chen@canterbury.ac.nz

9:00-9:15 AM (267)

Goal-Directed Selection during Visual Working Memory Maintenance: Examining the "Not under the Strategic Control" Account. MICHI MATSUKURA, *Drake University* – The classic literature of attentional control suggests that, during perceptual processing, one cannot ignore the non-predictive peripheral cue with luminance transients, while one can ignore the non-predictive central cue. Yet, a relatively recent study reported that selection of a particular item from visual working memory (VWM) is not under one's strategic control, even when the task requires the observers to process the meaning of the non-predictive central cue. Despite such a finding contradicts the results from other studies as well as what is known about the time course of goal-directed selection, possible mechanisms (that produced the "not under the strategic control" results) remain unknown. Through systematic searches for possible loci of the reported effect of interest, the present study investigated whether the reported effect actually reflects goal-directed (voluntary) selection or automaticity. Consistent with the aforementioned classic literature, the present results suggest that memory-level attention is indeed under one's strategic control.

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9:20-9:35 AM (268)

Passive Exposure Enhances Distractor Ignoring During Visual Search. JOY J. GENG and BO-YEONG WON, University of California, Davis (Presented by Joy J. Geng) - There is a long history of studies showing that the suppression of non-target "distractors" is affected by prior experience (Tipper, 1995). Both salient and non-salient distractors are better ignored when they recur. This has led to the suggestion that attentional priority to distractors is reduced through learned expectations for specific distractor features. However, recent studies from our lab and others report that simple exposure might be sufficient for reducing the impact of both salient and non-salient nontarget stimuli, even when that exposure is unrelated to past target selection. In this talk I will present data from four studies in which observers passively view colored stimuli during task-irrelevant "habituation" displays. Attentional capture by those same colors was attenuated when they later appeared as distractors during visual search. The results are consistent with a hypothesis that feature-based sensory habituation may contribute to the attenuation of distractor processing (Turatto and Pascucci, 2016). This suggests that the attenuation of repeated distractors may be due, in part, to domain-general mechanisms that reduce sensory responses to recurring stimuli. Email: Joy J. Geng, jgeng@ucdavis.edu

9:40-9:55 AM (269)

The Effect of Confidence Rating on a Primary Visual Task. DANIEL GOPHER and TALY BONDER, Technion-Israel Institute of Technology - We used brief exposures followed by mask of a Landolt gap discrimination task, probing the primary visual ability to detect contrast. Only during 200 practice trials, a Confidence Rating (CR) group rated responseconfidence in each trial. Two control groups: a standard task and a standard+delay equal CR times, performed the task without rating. Following practice, all groups performed 400 additional trials of the standard task. During practice, CR group did not show any significant benefit compared to the control groups. Following practice, the CR group was significantly more accurate while it did not differ in correct response times. Remarkably, this group was significantly slower when making errors. Moreover, unlike both controls it showed resilience to feedback from a previous trial on next trial response. Analysis also revealed an interaction in learning efficiency: Confidence Rating group significantly improved its performance after practice as compared to both control groups. Thus, confidence

rating demonstrated a clear advantage in formation of processing and response strategies in such brief exposures of a visual discrimination task, granting participants significant benefits in later performance.

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Speech Perception 518 A, Sunday Morning, 8:00-10:00 AM Chaired by Kristin Van Engen, Washington University in Saint

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8:00-8:15 AM (270)

Assessing the Cognitive Cost of Foreign-Accented Speech. KRISTIN J. VAN ENGEN, VIOLET A. BROWN and DREW J. MCLAUGHLIN, Washington University in Saint Louis, JULIA F. STRAND, Carleton College - Research on degraded and accented speech perception has traditionally focused on measures of intelligibility (e.g., proportion correct). However, additional emphasis has recently been placed on the cognitive effort required to process speech (i.e., listening effort). In the current study, we employed pupillometry and a dual-task paradigm to assess the cognitive costs associated with processing fully intelligible accented speech, predicting that adaptation to an accent would decrease effort over time. Both paradigms revealed greater effort for accented relative to native speech. The hypothesized adaptation effect emerged in the pupillometry experiment, and preliminary data suggests that the effect may be present, albeit weaker, in the dual-task experiment. These results suggest that even when speech is fully intelligible, resolving deviations between the acoustic input and stored lexical representations incurs a processing cost, and adaptation may attenuate this cost. Future research could investigate why the adaptation effect was more pronounced in the pupillometry experiment.

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8:20-8:35 AM (271)

Perceiving and Comprehending Dysarthric Speech. ERIN M. INGVALSON, Florida State University, MEGAN K. MACPHERSON, Central Michigan University, KAITLIN L. LANSFORD, Florida State University - Dysarthria is a motor speech disorder that results in impaired speech production ability. Interventions for dysarthria generally use intelligibility as their outcome measure defined as the listener's ability to understand the talker's message (Duffy, 2013). Though this definition includes the ability to both perceive and comprehend dysarthric speech (Klasner & Yorkston, 2005), intelligibility is often measured via solely perceptual metrics: listeners transcribe the talker's speech and a greater match between transcription and production is interpreted as better intelligibility. We previously demonstrated that older adults are as successful as younger adults at perceiving dysarthric speech, but older adults required more cognitive supports for the perception task (Ingvalson et al., 2017). In this project, younger and older adults completed speech comprehension tasks for both dysarthric and neurotypical talkers. Younger adults showed no difference in their comprehension of neurotypical speech vs. dysarthric speech, but older adults were poorer at comprehending dysarthric speech than neurotypical speech. Email: Erin M. Ingvalson, Erin.Ingvalson@cci.fsu.edu

8:40-8:55 AM (272)

Divided Attention Does Not Make /k/ Sound Like /g/. SVEN MATTYS, FAITH CHIU, and LYNDON RAKUSEN, University of York - There is evidence that the duration of an event is perceived as shorter under divided attention. "Time shrinkage" is thought to arise because rapid attentional switches between concurrent tasks lead to a loss of input samples, and hence, an under-estimation of duration. However, few studies have considered durations within a range relevant to speech perception (< 200 ms). For exception, Casini et al. (2008) found that, under divided attention, participants asked to report which of two near-homophonous CVC words they heard showed a bias towards reporting the word of the pair that had the shorter vowel. We attempted to replicate Casini et al.'s finding focusing on the $\frac{g}{-k}$ voice onset time (VOT) continuum. We found that divided attention introduced significant uncertainty in identification and discrimination of VOT-contrasted stimuli, but there was no evidence of a shift in VOT boundary. We conclude that sample loss under divided attention does not affect the perception of phonetic contrasts within the VOT range.

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9:00-9:15 AM (273)

Effects of Spatial Disparity on the Perceptual Organization of Speech. ROBERT E. REMEZ, MARIAH C. MARRERO, and SAMANTHA I. CABALLERO, Barnard College, Columbia University (Presented by Robert Remez) - The perceptual analysis of speech takes a continuously varying acoustic pattern of diverse composition, spanning 6 octaves, and projects it into a sequence of linguistic objects. The robustness of this cognitive function depends on a perceiver's ability to follow the evolving auditory sensory contour. In ordinary listening, the patterns available at each ear also differ, although laboratory conditions often impose identical signals binaurally. The present project used sine-wave replicas of speech to eliminate natural quality, forcing perception to rely principally on modulation sensitivity and, using dichotic presentation to oblige attention across the ears. Tone analogs of the first, third and fricative formants were presented to one ear and the tone analog of the second formant to the other. The organizational challenge was intensified by imposing departures from a temporally veridical presentation. This technique permits precise comparison of organization with ideal binaural presentation and with a calibrated departure in spectrum and in temporal coincidence. In contrast to prior tests, these new results revealed that distributing spatial attention taxes the perceptual organization of speech. Email: Robert Remez, remez@columbia.edu

9:20-9:35 AM (274)

When Phonological Representation Turns into Phonographic One: Neurophysiological Evidence from Novel Word Learning and Unattended Mismatch Negativity Paradigms. CHOTIGA PATTAMADILOK, Aix Marseille University, CNRS, LPL, DEIRDRE BOLGER, Aix Marseille University, ILCB, ANNE-SOPHIE DUBARRY, Aix Marseille University, CNRS, LPL - Learning to read changes the nature of speech representation. One possible change consists in transforming a phonological representation into a phonographic one. However, until now, no empirical evidence for such transformation has been reported. Here, we provide for the first time this missing evidence using a novel word learning paradigm. During the learning phase, participants learned unknown words in both spoken and written forms. Following this phase, the impact of spelling knowledge on spoken input perception was assessed at two time points through an unattended oddball paradigm, while the Mismatch Negativity component was recorded with EEG. Immediately after the learning phase, no influence of spelling knowledge on the perception of the spoken inputs was found. However, one week later, this influence emerged, making similar sounding words with different spellings more distinct than similar sounding words that also share the same spelling. Our finding provides novel neurophysiological evidence of an integration of phonological and orthographic representations that occurs once newly acquired knowledge had been consolidated. It questions the existence of a pure "phonological lexicon" in the literate mind.

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9:40-9:55 AM (275)

Linguists Are Brilliant, But Psycholinguists Should Be Wary of Shiny Linguistic Units. ARTHUR G. SAMUEL, BCBL; Ikerbasque; Stony Brook University - Bowers et al. (2016) (JML, 87, 71-83) used results from selective adaptation experiments to argue that phonemes play a critical role in speech perception. Mitterer et al. (2018) (JML, 98, 77-92) responded with their own adaptation experiments to advocate instead for allophones. These studies are part of a renewed use of the selective adaptation paradigm. I will first report results that demonstrate that the Bowers et al. findings were artifactual. Next, I will discuss the fact that both studies were under-informed about the extensive prior selective adaptation literature. The renewed use of adaptation in the field is a positive development, but many recent studies suffer from a lack of knowledge of prior adaptation findings. Finally, I will argue that the fundamental theoretical goal of the two papers (and many others) is misguided: Trying to "prove the psychological reality" of linguistic units has been a fool's errand for a half century. Email: Arthur G. Samuel, a.samuel@bcbl.eu

Working Memory I 519 B, Sunday Morning, 8:00-10:00 AM Chaired by Susan Ravizza, Michigan State University

8:00-8:15 AM (276)

Physical Salience and Experience Determine the Selection of Items into Working Memory but not Their Precision. SUSAN M. RAVIZZA and TAOSHENG LIU, *Michigan State University* – Items in working memory (WM) are prioritized if they are goal-relevant, physically salient, or have acquired importance based on experience. We propose that all ways of prioritizing information increase the likelihood that items will enter WM, but only goal-driven prioritization maintains the quality of those representations. We used a color WM task in which one of four locations was prioritized. Prioritization was manipulated either by 1) a central cue indicating probability of recall (goaldriven), 2) a sudden onset cue (salience), or 3) implicit learning from a preceding search task in which the target appeared more frequently in one location. Estimates of guess rate, precision, and swap rate were then calculated. As predicted, goal-driven prioritization resulted in better precision, but all ways of prioritizing information lowered the guess rate. We propose that maintaining memory precision is an effortful process that will be invoked if items are relevant to task goals.

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8:20-8:35 AM (277)

Rehearsal Improves Recall in Short-Term and Working Memory. GEOFF WARD, CATHLEEN CORTIS MACK, CHARLOTTE DOHERTY, NATHANAEL KNIGHT, and VANESSA M. LOAIZA, University of Essex - Two experiments examined the current controversy concerning whether rehearsal improves recall in short-term and working memory (WM) tasks. In Experiment 1, two groups of participants completed a complex span task in which they remembered sequences of words while performing an interleaved visuospatial processing task. The Overt Rehearsal group spoke aloud whatever list items came to mind during the processing task, while the Silent group performed the task in silence. Recall performance between the two groups was similar and recall in the Overt Rehearsal group was positively correlated with the degree to which participants completed cumulative forwardordered rehearsal. In Experiment 2, participants completed a modified Brown-Peterson span task: After initial presentation of three to-be-remembered words, participants received between 0 and 8 computer-prompted rehearsals, followed by a backwards counting filler task lasting between 0 and 18 seconds and then a test. Recall increased with the number of computerprompted rehearsals. We conclude that increased rehearsal causes improved recall in short-term and WM tasks. Email: Geoff Ward, gdward@essex.ac.uk

8:40-8:55 AM (278)

Tracking Eye Movements During Spontaneous and Directed Refreshing. VANESSA M. LOAIZA, University of Essex, ALESSANDRA S. SOUZA, University of Zurich - The function of refreshing has received growing interest for its proposed role of keeping accessible the most relevant contents of working memory (WM). Given that the field still lacks an online measure of refreshing, we examined whether eye movements may track the "mind's eye" to focus internal attention on no longer perceptually present information in WM both spontaneously (Exp. 1A) and with instructions to refresh memoranda (Exp. 1B). Participants studied an array of colored dots (with the set size calibrated to participants' individual ability level) followed by probed recall of one of the dots along a continuous color wheel. During the retention interval, the screen remained blank for 2.5 or 4 s (Exp. 1A) or a series of cues directed participants to "think of" (i.e., refresh) the previously presented colors 0, 1, or 2 times, with each of the cues presented for 0.5 or 1 s (Exp. 1B).

During both experiments, participants' eye movements were measured with an eye-tracker. As expected, refreshing cues improved performance, whereas cue duration had no impact. Furthermore, analysis of eye movements during the retention interval shed new light on the direct impact of spontaneous and directed refreshing on visual WM performance. Email: Vanessa Loaiza, v.loaiza@essex.ac.uk

9:00-9:15 AM (279)

Strategic Adaptation to Dual Task in Verbal Working Memory. VALÉRIE CAMOS and CLEMENT BELLETIER, Université de Fribourg, JASON DOHERTY and AGNIESZKA JAROSLAWSKA, University of Edinburgh, STEPHEN RHODES, NELSON COWAN, and MOSHE NAVEH-BENJAMIN, University of Missouri, PIERRE BARROUILLET, University of Geneva, ROBERT LOGIE, University of Edinburgh (Presented by Valérie Camos) - How working memory supports dual-task performance is a longstanding debate. In two experiments, we investigated changes in participant-reported strategies across a single and a dual-task (DT) conditions. We hypothesized that when a verbal serial recall task and a processing task (simple arithmetic verification) are performed in combination (DT), and/or with articulatory suppression (AS), individuals would change their strategies compared with a single task for both memory and processing. The use of rehearsal was reduced under AS, but not under DT. In contrast, elaboration was reported less under DT but did not change under AS. Under both DT and AS, more participants implemented a memory reduction strategy. For arithmetic verification, AS and DT resulted in a reduction in counting strategy, and DT in an increase in retrieval strategy. Careful investigation of strategy changes in response to different experimental conditions has considerable potential for resolving theoretical challenges.

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9:20-9:35 AM (280)

On the Dual Structure of Verbal Working Memory. PIERRE BARROUILLET and SIMON GORIN, University of Geneva, VALÉRIE CAMOS, Universite de Fribourg (Presented by Pierre Barrouillet) - According to the TBRS model, verbal information can be held in WM either in a phonological loop through articulatory rehearsal or in an executive loop through attentional refreshing. We recently tested this dual-structure hypothesis using a letter span task we called maxispan in which people perform a cumulative overt rehearsal of the *n* first letters presented (e.g., n = 3 to 5) and keep repeating these letters until the end of the list. This procedure leads to a dramatic increase in letter span which becomes close to 8. Here, we studied the nature of the representations held in the two systems by manipulating the phonological similarity (PS) of 7-letter lists. While the traditional simple span procedure led to the well-known pronounced PS effect, this effect disappeared in the articulatorily rehearsed part of the maxispan procedure (4 letters). Moreover, though the remaining three letters were encoded under the concurrent articulation of a phonologically similar material (i.e. the first 4 letters), they were better recalled than in the simple span procedure and immune from PS effect too. The implications of these results for the structure of verbal WM and the underlying mechanisms of the PS effect are discussed.

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9:40-9:55 AM (281)

A Comparison of Latent Variable Models and Network Models of Intelligence. ANDREW R.A. CONWAY, CHRISTOPHER J. SCHMANK, and SARA ANNE GORING, Claremont Graduate University, KRISTOF KOVACS, ELTE Eotvos Lorand University (Presented by Andrew Conway) - The positive manifold-the finding that cognitive ability measures demonstrate positive correlations with one another-has led to the notion of a general mental ability or general intelligence (g). This view has been reinforced by the use of factor analysis and latent variable models. However, a new theory of g, Process Overlap Theory (POT; Kovacs & Conway, 2016; 2019), posits that gis not a psychological attribute and rejects the notion of general intelligence. From this perspective, psychometric network analysis is an attractive alternative to latent variable modeling. To demonstrate the benefits of this approach, the Hungarian Wechsler Adult Intelligence Scale Fourth Edition (H-WAIS-IV) was analyzed using both psychometric network analysis and latent variable modeling. Network models provided a better fit to the H-WAIS-IV than latent variable models. We argue that POT, and network models, provide a more accurate view of the structure of intelligence than traditional approaches. Email: Andrew Conway, andrew.conway@cgu.edu

Motor Control 520 C, Sunday Morning, 8:00-9:40 AM Chaired by Oliver Herbort, Julius-Maximilians-Universität Würzburg

8:00-8:15 AM (282)

Grasp Planning for Object Manipulation Without Simulation of the Object Manipulation Action. OLIVER HERBORT, WLADIMIR KIRSCH, and WILFRIED KUNDE, Julius-Maximilians-Universität Würzburg - When we grasp objects, our grasps typically facilitate the planned object manipulations. We examined whether grasp selection for object manipulation is based on the simulation of the object manipulation action, that is, the body movements that are required to realize the intended object manipulation. In several experiments, we induced changes in the internal representations of the object manipulation actions involved in a knob-turning task. In three experiments, simulations of the object manipulation actions did not substantially inform grasp selections. Additional experiments asserted that our manipulation sufficed to reliably change grasp selections and that the induction procedure successfully affected internal representations of object manipulation actions. In summary, participants adapted their grasps to different intended object manipulations on a trial-to-trial bases, thus showing the end-state comfort effect. However, grasp planning was not based on simulations of the body movements associated with the currently planned object manipulation.

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8:20-8:35 AM (283)

Grasping in Predictable and Unpredictable Sensory Environments. GEORGIANA JURAVLE, Lyon Neuroscience Research Center, FRANCISCO L. COLINO, University of Victoria, GORDON BINSTED, University of British Columbia, Kelowna, ALESSANDRO FARNÈ, Lyon Neuroscience Research Center - Perceptual processing is closely intertwined with action. Here, we present six experiments (N=96) investigating sensory priors for action. Every trial, participants fixated a cylindrical object (smooth/carved) with instruction to prepare to grasp it. Vision was then occluded, and the object could/ not be replaced. Once vision returned (go signal), participants reached for, grasped, and lifted the object. The overall probability of the object being the same/different at the time of the go signal was manipulated by blocks (100%, 50%, 80%, and 80% + unexpected surprise) and instructed to participants. Further, participants were either allowed the initial fixation on the object, or to only tactually sense the object, before blindly executing the movement. They also executed the motor task with no instruction of probabilities. Results indicate that tactual attributes of an object consistently affect the reach-to grasp movement, as a function of their predictability. Unexpected sensory events alter the online hand pre-shaping for grasp, with both sensory availability and instructions significantly impacting hand kinematics. These results are discussed in the context of current theories of motor control, sensory surprise, and free energy.

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8:40-8:55 AM (284)

Electrophysiological Evidence Supporting Hemispheric Modularity in the Motor Cortex. STEVEN R. HOLLOWAY and JOŚE E. NAÑÉZ, SR., Arizona State University - It is well-known that the human motor system is contralaterally structured. This is reflected by the nearly complete crossing of cortico-spinal fibers from one side of the brain to distal musculature on the other, such that right-hand movements are associated with neural activity in the left motor cortex, and vise versa. Anecdotally, it seems much more difficult to move opposite direction ipsilateral hand/foot pairings than either same direction ipsilateral or opposite direction contralateral pairings. Here, we employed an EEG to measure brain activity while participants moved hand/foot combinations together in a clockwise or counterclockwise manner, and again, while they moved them simultaneously in opposite directions (e.g., hand moved clockwise while foot moved counterclockwise). The hand/foot pairings were also either ipsilateral or contralateral. As predicted, pilot data show that there is significantly greater neural activity in the ipsilateral opposite-direction condition. Surprisingly, significantly less interference was observed in the ipsilateral same-direction condition. These data match a model of neural processing in which the left and right motor cortexes each act as a modular unit.

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9:00-9:15 AM (285)

Tracking Differential Activation of Primary and Supplementary Motor Cortex Across Timing Tasks: An fNIRS Validation Study. HEATHER BORTFELD and ALI RAHIMPOUR, University of California, Merced, LUCA POLLONINI, University of Houston, DANIEL COMSTOCK and RAMESH BALASUBRAMANIAM, University of California, Merced (Presented by Heather Bortfeld) Introduction: Following an earlier fMRI study (Jantzen, Steinberg, & Kelso, PNAS, 2004), we used fNIRS to measure relative changes in cortical hemodynamics while participants performed a finger tapping task with systematically varied levels of difficulty. Materials and Methods: Ten right-handed volunteers performed a task involving two forms of toneguided finger tapping in two phases. This produced a 2x2 design: tapping synchronously/asynchronously relative to tone; pacing with/continuing without tone. Hemodynamic responses were averaged across trials in each of the four conditions and compared using multilevel regression models computed by autoregressive-iteratively reweighted least squares to characterize hemodynamic response functions. Conclusions: We observed activation in several cortical regions consistent with the Jantzen et al. study: Auditory-related activity corresponding to tone presence/absence, asynchronous tapping producing broader overall activation and higher amplitude activation than synchronous tapping, and significant increases in oxy-Hb across the motor network in direct relation to the complexity of the task. Finally, activation of left inferior frontal gyrus was driven by synchrony and not complexity. Email: Heather Bortfeld, hbortfeld@ucmerced.edu

9:20-9:35 AM (286)

Ebbinghaus Visual Illusion and Golf Putting: The Mediating Role of Knowledge. MAHÉ AREXIS, JOSEPHA LADOY, and FRANÇOIS MAQUESTIAUX, Université Bourgogne Franche-Comté - The question of whether Ebbinghaus's famous visual illusion influences golf putting remains controversial. Witt, Linkenauger, and Proffitt (2012) reported that their participants produced more successful putts when the target hole was surrounded by small circles (which are expected to increase the perceived hole size) than when it was surrounded by larger circles. However, in three attempts, we did not replicate this surprising finding. We also selectively manipulated the type of knowledge (declarative vs. procedural) acquired before the participants were exposed to the illusion. To do so, we manipulated the quantity of errors (low/high error rates; Experiment 1) or the level of expertise acquired through practice (Experiment 2). Results of Experiment 1 strongly suggest that a predominance of procedural knowledge favors the emergence of illusion effects on golf putting, whereas a predominance of declarative knowledge does not. We will also report the results of Experiment 2, which is still under way.

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Statistics and Methodology 520 F, Sunday Morning, 8:00-9:40 AM Chaired by J. Toby Mordkoff, University of Iowa

8:00-8:15 AM (287)

Removing Bias from an Estimate of Population Effect Size. J. TOBY MORDKOFF, *University of Iowa* – The standard estimate of population effect size, partial eta squared (η_n^2) , is known to

have substantial positive bias. There are two less-biased options, partial epsilon squared (ε_p^2) and partial omega squared (ω_p^2), but, for myriad reasons, these are seldom used. This is a serious issue, because accurate estimates of population effect size are critical for both reporting experimental results and conducting *a priori* power analyses. To correct for this problem, I will provide a simple method for removing bias from η_p^2 , producing a value called *adjusted partial eta squared* (adj η_p^2), which is analogous to adjusted or "shrunken" R² from regression analysis. Email: J. Toby Mordkoff, jonathan-mordkoff@uiowa.edu

8:20-8:35 AM (288)

A Bayesian Procedure for the Kendall tau and the Goodman-Kruskal G Statistic. RICHARD CHECHILE, *Tufts University* – A new Bayesian analysis is described for the nonparametric Kendall tau rank correlation. The Bayesian method is based on a proof that the Kendall tau is a case of implicit censored-Bernoulli sampling that has an exact conjugate probability representation for all sample sizes. It is also shown that when ordered contingency tables are used without grouping then the Goodman-Kruskal G statistic is equivalent to the Kendall tau. The new procedure is useful for the analysis of ordered-contingency tables in common use in metacognition. In addition, the new method can be useful as a Bayesian nonparametric goodnessof-fit metric for theory testing. Specific applications of this type of assessment are discussed.

Email: Richard Chechile, richard.chechile@tufts.edu

8:40-8:55 AM (289)

The 'Paradox' of Converging Evidence. CLINTIN P. DAVIS-STOBER, University of Missouri, MICHEL REGENWETTER, University of Illinois at Urbana-Champaign - We explore the implication of viewing a psychological theory as the logical conjunction of all its predictions. Even if several predictions derived from a theory are descriptive of behavior in separate studies, the theory as a whole may fail to be descriptive of any single individual. We discuss what proportion of a population satisfies a theory's joint predictions as a function of the true effect sizes and the proportion of variance attributable to individual differences. Unless there are no individual differences, even very well replicated effects may fail to establish that the combination of predictions that have been tested accurately describes even one person. Every additional study that contributes another effect, rather than strengthening support for the theory, may further limit its scope. Using illustrative examples from cognitive and social psychology, we show how, in particular, small effect sizes dramatically limit the scope of psychological theories unless every small effect coincides with little to no individual differences. (Davis-Stober, C. P., & Regenwetter, M. [in press]. The 'paradox' of converging evidence. *Psychological Review*.)

Email: Clintin Davis-Stober, stoberc@missouri.edu

9:00-9:15 AM (290)

Science is not a signal detection problem. JOHN T. WIXTED, BRENT M. WILSON, and CHRISTINE R. HARRIS, *University* of *California*, *San Diego* (Presented by John Wixted) – The perception that science is in a state of crisis depends on null hypothesis significance testing (NHST) logic, according to which an experimental hypothesis is either categorically true or categorically false. The apparent crisis is that a large proportion of the p < .05 scientific literature is categorically false. However, underlying effect sizes may be continuously distributed, in which case the binary true-vs.-false distinction would be of little value. In addition, our understanding of scientific research and the consequences of certain proposed reforms would both be off target. For example, increasing power by increasing sample size-a popular reform-would ensure publishing underlying p < .05 effect sizes that are even closer to zero, on average, than they are today. We distinguish between original science vs. replication science, arguing that NHST logic is a useful fiction for the former but not for the latter. For original science, a reasonable goal is to select effects that merit further consideration, not to select "true" effects. For replication science, the goal should be to quantify the underlying effect size (the only truth there is) via high-powered direct replication, without regard for statistical significance. Email: John Wixted, jwixted@ucsd.edu

9:20-9:35 AM (291)

The (In)validity of Citation Counts and Journal Impact Factors as Measures of Research Quality. MICHAEL DOUGHERTY, University of Maryland, ZACHARY HORNE, Arizona State University - Citation data and journal impact factors are important components of faculty dossiers and figure prominently in both promotion decisions and a researcher's perceived broader societal impact. Although these metrics play a large role in high-stakes decisions, the question of whether (or how) they relate to research quality has been debated. In this paper, we take a novel approach by examining how citation counts and journal impact factors relate to four objective metrics of research quality: errors in statistical reporting, the evidentiary value of data, expected replicability, and actual replicability. Based on an analysis of over 45,000 journal articles, 116 psychology journals, and 100 replication attempts, we failed to find convincing evidence that articles with greater numbers of citations or journals with higher impact factors are of higher quality. Worse yet, based on some metrics, there's an inverse relation between research quality and journal impact factor. We illustrate that distributions of citation counts across multiple disciplines are consistent with an entirely stochastic process based on an exposure probabilities. Email: Michael Dougherty, mdougher@umd.edu

Spatial Cognition II

518 B, Sunday Morning, 8:00-9:40 AM *Chaired by Leah Fostick, Ariel University*

8:00-8:15 AM (292)

The Effect of Different Types of Hearing Protection Devices on Sound Localization. LEAH FOSTICK, *Ariel University*, HARVEY BABKOFF, *Bar-Ilan University*, NIR FINK, *Ariel University*, *IDF Medical Corps* – Sound localization is an essential ability for survival. It depends on hearing ability and is disrupted when hearing ability deteriorates, or when the sounds that reaches the ear are muffled or distorted. In a combat environment, soldiers are exposed to loud noises and therefore are required to use hearing protection devices (HPDs). In this study we aimed to test sound localization with various HPDs in order to quantify and predict the reduction in sound localization accuracy, by sound characteristics of the protective devices. Five groups of 25 participants performed the sound localization tasks. The tasks included the localization of 200 ms pink noise, one-syllable word, and sound accompanying shooting, delivered by one of eight loudspeakers positioned every 45 degrees, beginning with 22.5° to the right of center. The participants performed the task twice, with and without HPD. The data showed: (1) Decease in localization accuracy with increase in sound attenuation; and (2) relation between the acoustic characteristics of the HPD device and localization accuracy. These results provide information regarding the disruption of localization by various HPDs in terms of their acoustic characteristics, and have implications for sound localization among different groups, such as the hearing impaired, aging adults, and those who use earbuds while crossing the street.

Email: Leah Fostick, Leah.fostick@ariel.ac.il

8:20-8:35 AM (293)

Spatial dependency in local resource distributions informs misperception of randomness research. ANDREAS K. WILKE, Clarkson University - Past research investigating why humans misunderstand random data sets has typically focused on computing alternation probabilities that indicate the degree of spatial aggregation, randomness, or dispersion. We incorporate a new statistical methodology to better capture important ecologically relevant characteristics of the environment. We collected data near our university campus from both developed and natural resource domains, such as seats taken in a restaurant, occupied parking spots, animal distributions, and local patterns of wilderness, forest, and water. Our results extend the available statistical tools for randomness research and provide novel evidence that natural resource domains indeed show more aggregated distribution patterns than those from human-developed resource domains. This supports recent claims that our ancestral human cognitive evolution selected for specific reasoning mechanisms to detect resources that are distributed in clumps or patches in space and time. We discuss implications for the validity of contemporary research on the so-called hot hand fallacy.

Email: Andreas K. Wilke, awilke@clarkson.edu

8:40-8:55 AM (294)

Testing Gender Differences in Dimensionality Crossing in Mental Rotation using Virtual Reality and 3D Printed Objects. MEREDITH MINEAR, MIKAELA PRIEST, BARBERIS, ADRIAN VIKKI ALDEN, **KENNETH** MCCLURE, and ALEXA MILBRADT, University of Wyoming (Presented by Meredith Minear) - Mental rotation shows large gender differences with better performance by males especially for 3-dimensional rotation (Voyer, Voyer & Bryden, 1995). These tasks are typically administered using 2D representations of 3D objects requiring a mental transformation from a 2D to 3D mental image. It has been hypothesized that this dimensionality crossing contributes to the gender difference and when actual 3D objects are used, gender differences are reduced or eliminated (McWilliams, Hamilton, & Muncer, 1997). We tested this by administering the Purdue Spatial Visualizations Test-Rotations to 171 participants (85 female) randomly assigned to one of three presentation conditions: 1) 2D presentation of drawn 3D objects, 2) 3D presentation of the same objects rendered in virtual reality using a head mounted display (HTC Vive) and 3) 3D presentation of real world objects created using 3D printing. Overall, we found best performance for real world objects. However, males outperformed females in all three conditions.

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9:00-9:15 AM (295)

Pattern Recognition in Vision as Model Discovery within a Coordinate Representation. JONATHAN I. FLOMBAUM, Johns Hopkins University, FEITONG YANG, Johns Hopkins University & Google - We easily recognize patterns among spatially discontinuous units. Consider the scatter-plot. It conveys a relationship between variables because people 'just see' the relationship. But what does it mean to 'just see' a relationship? We suggest that pattern recognition in human vision operates like a researcher does, seeking to statistically characterize a relationship between variables: vision seeks an algebraic rule to describe the relationship between spatially distributed stimulations. We support this claim with Glasspattern experiments where recognition is constrained by the polynomial complexity of patterns to be recognized (thereby, the complexity of the models to be fit). We also suggest that model fitting relies on polar spatial representations. The evidence includes recognition advantages for patterns with linear models in polar terms (compared to patterns with Cartesian-linear models), and visual search asymmetries favoring polar-linear patterns. The results explain the difficulty of recognizing some patterns compared to others by reference to their respective algebraic complexity. And the results support the hypothesis that the brain implements algebraic computation over variables within a coordinate representation.

Email: Jonathan Flombaum, flombaum@jhu.edu

9:20-9:35 AM (296)

Modeling Visual Crowding in Mazes. YELDA SEMIZER and DIAN YU, Massachusetts Institute of Technology, QIANQIAN WAN, University of Hong Kong, BENJAMIN BALAS, North Dakota State University, RUTH ROSENHOLTZ, Massachusetts Institute of Technology - Mental maze solving involves both cognitive and perceptual processes and can provide a controlled environment to study visual crowding, a well-known limiting factor in peripheral vision. In the current study, we investigated the relationship between the perceptual difficulty of mazes and visual crowding. Human observers solved a series of mazes while we recorded their maze solving time (Experiment 1&2) and also tracked their eye-movements (Experiment. 3). The visual features of mazes were manipulated to alter the level of crowding in each maze (i.e., path thickness, visual complexity). Experiment 1&2 showed that observers were faster at solving mazes when the paths are thinner and less complex, suggesting visual crowding indeed affects maze solving performance. In Experiment 3, we tested whether a crowding model (The Texture Tiling Model; TTM) can predict fixation allocation during maze solving. Preliminary results suggest that TTM indeed has predictive power for eye-movement patterns in mental maze solving.

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Letter/Word Processing II 520 C, Sunday Morning, 10:00 AM-12:00 PM Chaired by Nicolas Dumay, University of Exeter

10:00-10:15 AM (297)

Sleep Makes Perceptual Memories More Accessible: Evidence from Reicher-Wheeler. NICOLAS DUMAY and ANTONIA NASH, University of Exeter - This study examined whether sleep contributes to the development of the word superiority effect in Reicher-Wheeler letter identification. Participants learnt novel (made-up) orthographic neighbours of existing hermit words ('lefture' from 'lecture') via repeated study-and-test cycles. Whereas the PM-group learnt Set 1 at 8pm and Set 2 at 8am the next day, the AM-group learnt Set 1 at 8am and Set 2 at 8pm on the same day. At the 12-hr test (immediately after learning Set 2), the PM-group showed evidence of offline, sleep-associated additional learning, whereby letter identification was better for 12-hour-old pseudowords and worse for their base words, relative to their 0-hour-old counterparts. The AM-group, in comparison, showed forgetting of Set 1 in the awake state, until sleep helped recover this knowledge for the 24-hr retest. By making perceptual memories more accessible to the detriment of existing representations, sleep thus plays a significant role in the word superiority effect.

Email: Nicolas Dumay, nicolas.dumay@gmail.com

10:20-10:35 AM (298)

To What Extent Does Lexical Decision Performance Reveal Participant Characteristics? EMMANUEL KEULEERS and XUE QIN, Tilburg University - The large effects of word frequency/diversity and word prevalence on lexical decision performance show that language processing is heavily influenced by the language environment. Age and education have also been shown to be predictive of lexical decision performance, while gender has shown less effect (e.g., Keuleers, Stevens, Mandera, & Brysbaert, 2015). However, research has usually discounted performance on individual stimuli. To quantify the extent to which the performance on individual items reflects the language environment, we investigated to what extent gender and education could be predicted by individuals' LDT performance. Using simple reference classifiers based on the correlation between an individual's RTs on 70 randomly chosen words from a set of \pm 60,000 and the average RTs for those items by gender by education level in a large vocabulary test, gender could be predicted with relatively high accuracy while education was predicted with medium to low accuracy. This suggests that research on the effects of the language environment on processing needs to focus on performance on individual items. A more troubling conclusion is that chronometric records of language processing could be used to profile a person's identity. Email: Emmanuel Keuleers, E.A.Keuleers@tilburguniversity. edu

10:40-10:55 AM (299)

Feedforward Inhibition from Letters to Words is Heterogeneous: Comparing All-Letter-Different Primes Formed of Neighborly and Non-Neighborly Letters. JAMES S. ADELMAN, DAVID J. HARVEY, and ILIYANA V. TRIFONOVA, University of Warwick - Many developments in orthographic processing are motivated by testing, and if needs be, replacing, the assumptions of the Interactive Activation model of McClelland and Rumelhart (1981). An assumption that has received little attention is that letter-word inhibitory connections all share the same strength - for instance, activity in the letter J has the same impact on a word like DATE as does equivalent activity in the letter R. However, basic associative learning mechanisms imply that the existence of the neighbor word RATE gives more opportunity to learn such a negative weight from the *neighborly* letter R than for the non-neighborly letter J, leading to stronger negative letter-word weights for neighborly than non-neighborly letters. As such, in masked primed lexical decision, roza should be a more inhibitory prime for DATE than *jicy* (with the reverse being true for PUNK). We present (i) simulations of weight learning using Rescorla and Wagner's (1972) equations and (ii) experimental results consistent with this prediction. A mechanism of heterogeneous feedforward inhibition from letters to words might contribute to phenomena previously attributed to lateral competition at the word level.

Email: James S. Adelman, J.S.Adelman@warwick.ac.uk

11:00-11:15 AM (300)

Function Word Restoration. LIANG TAO, Ohio University, ALICE F. HEALY, University of Colorado, Boulder - In 2 experiments subjects read Chinese passages and their English translations, each missing 8 frequent function words (English THE and Chinese DE) with no indication of missing words. In Experiment 1 native Chinese and native English speakers from 2nd to 4th year Chinese language classes processed each passage in 3 tasks: reading and rating comprehensibility, answering comprehension questions, then rereading and inserting THE/DE. Despite missing function words all subjects showed high comprehension except for native English speakers on Chinese passages. For inserting missing function words, subjects did well only in their native language. In Experiment 2 native English speakers in a 2nd year Chinese language class and native Chinese speakers read aloud the passages, then answered comprehension questions. All subjects made few comprehension errors. However, when reading aloud they were affected by the missing function words, but only in their native language. They made short pauses where words were missing, or they added the missing words. These findings indicate that frequent function words even when absent are not disregarded by native speakers but rather are treated as necessary, reflecting a word-restoration effect in reading. Email: Liang Tao, tao@ohio.edu

11:20-11:35 AM (301)

How the Nature of a Writing System Shapes Reading Acquisition. KATHLEEN RASTLE and ADAM JOWETT, *Royal Holloway, University of London, JSH TAYLOR, Aston University, TIBOR AUER, Royal Holloway, University of London,*

ANGELIKA LINGNAU, University of Regensburg (Presented by Kathleen Rastle) - Writing systems vary in the way that they express the sounds and meanings of spoken language. We used an artificial orthography paradigm to test whether and how these differences influence reading acquisition. 24 participants were trained over 10 days on two artificial languages comprising alphabetic and logographic writing systems. Following training, the nature of learned knowledge was assessed using a variety of behavioural tasks as well as an fMRI task involving semantic monitoring. Despite engaging in the same training tasks, participants learned alphabetic and logographic writing systems in different ways. Behavioural results showed that reading aloud was faster and more accurate in the alphabetic system than in the logographic system, while the reverse was true for a meaning-retrieval task. These results were supported by univariate analyses of fMRI data showing that reading in the alphabetic system led to greater activation of dorsal pathway brain regions, while reading in the logographic system led to greater activation of ventral pathway brain regions. These results demonstrate how the writing system shapes the division of labour between spelling-sound and spelling-meaning pathways in reading acquisition.

Email: Kathleen Rastle, Kathy.Rastle@rhul.ac.uk

11:40-11:55 AM (302)

Predictions from a New Model of Reading. JOSHUA SNELL, Vrije Universiteit Amsterdam, JONATHAN GRAINGER, Aix-Marseille University - Reading research has long endorsed the view that words are processed strictly one-by-one. One reason for this is that a parallel processing system would supposedly run into various problems (e.g. mixing-up information across words, confusing the order of words). A second reason is that models of eye movements in text reading have treated the word recognition process as a black box. In the visual word recognition literature, which as a sub-domain has been quite disconnected from the former endeavor, it has long been known that parallel word processing is needed to account for many behavioral phenomena. Here we bridge the gap between the domains of single word reading and eye movements in text reading, with a new model: OB1-reader. OB1 answers the question of how a parallel processing system can successfully handle input from multiple words, but also reveals under what circumstances the reading process can go awry. The model has sparked fresh predictions, with ensuing research revealing phenomena that complicate the serial processing perspective. We highlight two of these phenomena: sentence superiority effects and noisy word position coding. Taken together, we believe that reading research is ready for a paradigm shift.

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Decision Making II 520 F, Sunday Morning, 10:00 AM-12:00 PM Chaired by Christian C. Luhmann, Stony Brook University

10:00-10:15 AM (303)

No Free Lunch: Illustrating Inherent Theoretical Tradeoffs in the Context of Intertemporal Choice. CHRISTIAN C. LUHMANN and PHILLIP A. LOATMAN, *Stony Brook*

University (Presented by Christian Luhmann) - What do we expect from a "good" psychological theory? Intuitively, we want theories that are consistent with empirical data. One downside of this desire is that it discourages theoretical parsimony, illustrating how achieving one theoretical goal may compromise another. Here we explore such tradeoffs in the domain of intertemporal choice, which has seen a recent explosion of models designed to reproduce an increasing set of behavioral anomalies at the expense of parsimony. We test ten models using data sets capturing two classic behavioral anomalies: the magnitude effect and violations of stationarity. Results suggest model "goodness" is not a single dimension. For example, a model successfully reproducing the quantitative patterns of data (e.g., yielding a good fit) need not do so by reproducing qualitative effects of interest. Similarly, a model's ability to reproduce qualitative effects of interest seems unrelated to its ability to predict those same qualitative effects. Overall, results suggest that model "goodness" strongly depends on the modeling objective. Every theory represents a tradeoff: some theoretical objectives are prioritized. and others are sacrificed. Assuming otherwise will continue to limit psychological theory. Email: Christian C. Luhmann, christian.luhmann@stonybrook. edu

10:20-10:35 AM (304)

An Unconscious Order Effect in Complex Decision Making. ARNAUD REY, KÉVIN LE GOFF, MARLÈNE ABADIE, and PIERRE COURRIEU, CNRS & Aix-Marseille University - In two experiments, participants were presented with information about four cars, each characterized by 12 attributes. Immediately following the presentation of the 48 sentences describing these four cars, participants had to choose the one they would prefer to purchase. Two cars shared exactly the same positive and negative attributes, but for one car, positive attributes were systematically displayed at the beginning while it was the reverse for the other car. The two remaining cars were used as fillers. Results from Experiment 1 revealed a massive effect of information order with a clear preference for the car with positive information presented at the beginning. Experiment 2 further showed that this order effect was maintained and still strong even if the target cars did not have more positive attributes than the filler cars. Interestingly, in both experiments, participants never noticed that two cars were exactly characterized by the same list of attributes. These data clearly demonstrate that information order is a critical factor in complex decision-making situations involving a large amount of information.

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10:40-10:55 AM (305)

Moral Superadditivity Effect. MARIOLA PARUZEL-CZACHURA, *University of Silesia*, MICHAŁ BIAŁEK, *Kozminsky University* – People form moral impressions of agents by considering their moral misconduct. This forming of negative impressions can, however, be countered by mitigating factors such as expression of socially desirable views (like thinking that unethical behavior is unacceptable) and of emotions such as guilt. We explored how views and emotions of agent affect judgements about their morality after doing unethical behavior like murdering, stealing, fighting and cheating on a partner. We used "quilt" as example of socially desirable moral emotion and "thinking that my behavior is unacceptable" as example of socially desirable view. We report five studies (N>1000), in which we used different types of unethical behaviors and we manipulated the information about agent's views and emotions (socially desirable or undesirable). We found that agent's views are more relevant than emotions. Moreover, we established a moral superadditivity effect, whereby jointly expressing both socially desirable views and emotions significantly higher the evaluations of other's morality. During the presentation we want to describe this effect and discuss possible future studies in this area.

Email: Mariola Paruzel-Czachura, mariola.paruzel-czachura@us.edu.pl

11:00-11:15 AM (306)

In Search of Rational Judgments in Contingency Learning: Effects of Trial Sequencing on the Strength of Illusory Causation. EVAN J. LIVESEY, JULIE YEW LI CHOW, and JENNY YANG, The University of Sydney - When judging the relationship between two probabilistic events, people display sensitivity to the contingency between those events, for instance, the extent to which a causal cue elevates the probability of an outcome above an observed base-rate. However, when the events are statistically unrelated, people display a tendency to falsely regard the cue as causing the outcome, and this illusory causation is strongest when both the cue and the outcome occur frequently. The types of procedures that most reliably produce these illusory effects have particular properties that limit the individual's ability to calculate and reason appropriately about the base-rate of the outcome. We tested whether one of these properties-the sequencing of trial types, and the length of runs of consecutive cue-absent trials (required to estimate the baserate) in particular-affected the strength of illusory causation. Using a task with an ineffective treatment cue and a fictitious medical outcome, we found that clustering of trial types had a substantial impact on illusory causation even when the event frequencies were held constant. Implications for theories of contingency learning and false belief will be discussed. Email: Evan Livesey, evan.livesey@sydney.edu.au

11:20-11:35 AM (307)

Utility Without Regularity. Random MICHEL REGENWETTER, University of Illinois at Urbana-Champaign, JOHANNES MUELLER-TREDE, University of Navarra -Classical random utility models imply a consistency property called regularity. Decision makers who satisfy regularity are more likely to choose an option x from a set X of available options than from any larger set Y that contains X. In light of ample empirical evidence for context-dependent choice that violates regularity, some researchers have questioned the descriptive validity of all random utility models that are used heavily across numerous disciplines. We show that not all random utility models imply regularity. We propose a general framework for random utility models that accommodate context dependence and may violate regularity. Mathematically, like the classical models, context-dependent random utility models form convex polytopes. They can be leveraged to make parsimonious behavioral predictions and are empirically testable using contemporary methods of order-constrained inference. Email: Michel Regenwetter, regenwet@illinois.edu

11:40-11:55 AM (308)

Generalizing Financial Decision Making to Other Domains. TOBY PRIKE, JAKUB BIJAK, and PHILIP A. HIGHAM, University of Southampton - A great deal of research has examined risk preferences and utility functions for purely financial decisions. However, it is less clear how well these findings generalise to decisions made in other domains. In a pre-registered study, we examined choices between gambles in financial and migration contexts. This allowed us to present items that were structured identically (risks of gaining or losing monthly income) but varied in terms of the context of the decision. Non-parametric utility functions were elicited for both contexts and we tested whether these functions differed. We found no significant differences between the contexts for loss aversion or the shape of the utility functions (range BF_{10} = 0.09 - 0.21). These findings provide some initial evidence to support the idea that financial decision making generalises to other domains. However, further work manipulating task context and presentation can help to determine how well financial decision making generalises to other domains. Email: Toby Prike, T.M.Prike@soton.ac.uk

Metamemory and Cognition 519 A, Sunday Morning, 10:20-11:15 AM Chaired by Kit Spenser Double, University of Oxford

10:20-10:35 AM (309)

Do Confidence Ratings Prime Confidence? KIT SPENSER DOUBLE, University of Oxford, DAMIAN BIRNEY, University of Sydney - Confidence ratings (CR) are one of the most frequently used measures in psychological research. However, recent evidence has suggested that eliciting CR from participants may result in changes to cognitive performance, so called reactivity. Here, we examine whether reactivity to CR can be better explained by added task-relevant introspection, or, alternatively, the unintentional priming of confidence-related beliefs. First, we compare participants' performance in a group making CR with a group making a task-irrelevant control rating, and a second group who made the same task-irrelevant rating, but with the word 'confident' included in the rating's wording. The results suggest that reactivity is driven by the presentation of the word 'confident', and reactivity does not require taskrelevant introspection. Additionally, we show that rephrasing CR to remove the word 'confident' neutralises reactivity. This suggests that reactivity may represent a significant problem for researchers using CR, but rephrasing CR may remedy these concerns in relatively simple fashion.

Email: Kit Spenser Double, kit.double@education.ox.ac.uk

10:40-10:55 AM (310)

Motivation-based Selective Encoding and Retrieval. VERED HALAMISH and PNINA STERN, *Bar-Ilan University* – In many situations we are motivated to remember certain pieces

of information more than we are motivated to remember other pieces. For example, students learning for finals have a stronger motivation to remember materials they expect to be worth more points in the exam. The literature suggests that such motivation enhances memory performance. Surprisingly, however, little is known about the processes underlying this effect. We propose an integrative framework that describes potential motivation-based selective processes that can take place both during encoding and during retrieval. In a series of studies, these processes were simultaneously evaluated using a unique paradigm that allows participants to control various parameters of encoding and retrieval under relatively naturalistic settings. Results reveal the processes learners use to selectively encode and selectively retrieve information they are motivated to remember. These results shed light on the intricate relationship between motivation, metacognition, and memory. Email: Vered Halamish, vered.halamish@biu.ac.il

11:00-11:15 AM (311)

Confidence is Computed Automatically: Evidence from Confidence Leak. DAVID AGUILAR-LLEYDA, Centre d'Économie de la Sorbonne, MAHIKO KONISHI, École Normale Supérieure & Centre-d'Économie-de-la-Sorbonne, JÉRÔME SACKUR, École Normale Supérieure & École Polytechnique, VINCENT DE GARDELLE, CNRS & Paris School of Economics - Humans can estimate how confident they are on the correctness of a choice, but an open question is whether confidence is computed even when not explicitly asked for. We tackled this question by capitalizing on the finding that confidence leaks from one decision to another. On each trial of our experiments, participants made two choices: reporting the predominant color and the predominant letter of an array. In Experiment 1, each choice was followed by a confidence rating. In Experiment 2, each trial only required a confidence rating for one choice, with participants not knowing the choice until the rating scale appeared. In Experiment 3, participants knew beforehand the only choice for which confidence would be required. In all experiments confidence for correct choices was greater than for errors. We also observed a confidence leak: confidence for a choice was greater when the other choice for that trial had been correct than when it had been an error. Crucially, a leak in Experiment 3 meant that confidence for the choice with no required rating was still computed and influenced the confidence rating for the other choice. These results support the idea that confidence is computed automatically, even when not asked for.

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Working Memory II 519 B, Sunday Morning, 10:20 AM-12:00 PM Chaired by Eda Mizrak, University of Zurich

10:20-10:35 AM (312)

Evidence Against Proactive Interference from Long-Term Memory to Working Memory. EDA MIZRAK and KLAUS OBERAUER **Q**, *University of Zurich* – Proactive interference (PI) from previously learned information to remembering of more recently learned information is a well-documented finding for long-term memory (LTM), however, it is unclear whether working memory (WM) is also prone to such PI. Across five experiments, we measured serial recall performance to four types of short lists; a) whose items were repeated in the same order (Hebb), b) whose items were same items with the Hebb list but their order was randomized at each trial(Interference 1), c) whose items completely overlapped with the Hebb list for the first three items and the rest were shown in a random order (Interference 2), and d) whose items did not overlap with another list type and were shown in a random order at each trial (Control). We hypothesized that Hebb list will be learned and stored in LTM over time ("Hebb Effect"). We tested whether learned Hebb lists interfered with remembering of same items in different positions from Interference lists. In all the experiments we found no difference between Interference and Control list performance suggesting there was no PI from LTM to WM. Email: Eda Mizrak, eda.mizrak@psychologie.uzh.ch

10:40-10:55 AM (313)

The Transition to Procedural Representation in Rapid Task Set Acquisition. STEPHEN MONSELL and BRONTË GRAHAM, University of Exeter - How quickly are instructions for a task translated into an effective task set? If declarative working memory (DWM) is used to maintain a task's S-R rules while practice compiles them into procedural memory, variables that affect DWM retention and retrieval should influence task performance while it is still dependent on DWM. Participants were trained on a series of 6-choice RT tasks, with a 1:1 mapping from object pictures to keys. For each task, an instruction phase was followed by test trials. The phonological similarity of the objects' names had an effect on performance only during the first few encounters with a stimulus. Even when the instruction phase was deleted so that participants had to learn the S-R mappings by trial and error, the effect of similarity was short-lived. An effective task-set is rapidly "compiled" through instruction and/or early feedback; verbal DWM plays little role thereafter.

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11:00-11:15 AM (314)

Sex Differences in Verbal Working Memory: A Meta-Analysis. DANIEL VOYER, University of New Brunswick, JEAN SAINT-AUBIN, Universite de Moncton, KATEY ALTMAN, University of New Brunswick, GENEVIEVE GALLANT, Universite de Moncton - This paper will present the results of a multilevel meta-analysis on sex differences in verbal working memory. The set of 805 effect sizes drawn from 457 samples showed an overall female advantage reflecting a small effect size of 0.049 (95% confidence interval: 0.025, 0.073). Although the female advantage generalized across most tasks, it remained small. The effect was largest for the California Verbal Learning Test (and its variations: d = 0.176) and the smallest effect was for serial recall (d. = 0.02). The remaining effects sizes were as follows: complex span = -0.036, cued tasks = 0.091, and free recall = 0.147. Moderator analyses were also computed and their results will be presented as part of the paper. Despite the small magnitude of the effects, the results suggest that sex differences should not be overlooked when theorizing about verbal working memory. Email: Daniel Voyer, voyer@unb.ca

11:20-11:35 AM (315)

The Role of Semantics in Visual Working Memory Tasks. ROY SHOVAL and TAL MAKOVSKI, The Open University of Israel - It was recently reported (e.g., Endress & Potter, 2014) that in the absence of Proactive Interference (PI), the estimated memory capacity K, as typically measured in Visual Working Memory (VWM) tasks, is significantly higher than previous estimations. In three experiments, we tested whether the use of meaningful items is the source of this enlarged capacity. Participants performed a VWM task with three types of stimuli: (1) realworld objects that were distinct in both their meaning and visual properties, (2) a distorted version of these objects that kept their visual distinctiveness while largely eliminated their meaning, and (3) images of faces with low distinctiveness in both semantics and visual properties. The results revealed that semantics is a critical factor in PI. More importantly, meaningless objects, although visually distinct, failed to reveal high capacity estimations. These findings imply that items' meaning, presumably held in Long-Term Memory, is involved in VWM tasks. Email: Roy Shoval, rshoval@gmail.com

11:40-11:55 AM (316)

Fluctuations of Attention and Working Memory. MEGAN T. DEBETENCOURT, PAUL A. KEENE, EDWARD AWH, and EDWARD K. VOGEL, University of Chicago - Attention and working memory are intricately related. However, an aggregate relationship between these cognitive processes doesn't presuppose anything about how they covary moment by moment. We developed a novel hybrid task to assess attention and working memory behavioral fluctuations on a fine-grained timescale. Participants performed a sustained attention to response task, interleaved with occasional working memory probes. We observed attention and working memory fluctuated synchronously: when attention was worse, participants remembered fewer items. However, these fluctuations were not due to differences of general task engagement, as attention did not fluctuate along with the precision of a single representation. This suggests that attention and working memory fluctuate together when they share a common cognitive resource. Follow up studies have characterized the spatial and electrophysiological nature of attention fluctuations. Together, these studies provide new insight into the synchronous and multifaceted relationship between attention and working memory across time. Email: Megan T. deBettencourt, debetten@uchicago.edu

Bilingualism

518 A, Sunday Morning, 10:20 AM-12:00 PM *Chaired by Mathieu Declerck, Aix-Marseille University*

10:20-10:35 AM (317)

Unified Syntax in the Bilingual Mind. MATHIEU DECLERCK, YUN WEN and JOSHUA SNELL, *Aix-Marseille University*, GABRIELA MEADE, *San Diego State University & University of California, San Diego*, JONATHAN GRAINGER, *Aix-Marseille University* – Are syntactic representations shared across languages, and how might that inform the nature of syntactic computations? To investigate these issues, we presented French-English bilinguals with mixed-language word

sequences for 200 ms and asked them to report the identity of one word at a post-cued location. The words either formed an interpretable grammatical sequence via shared syntax (e.g., *ses feet sont big* – where the French words *ses* and *sont* translate into *his* and *are*, respectively) or an ungrammatical sequence with the same words (e.g., *sont feet ses big*). Word identification was significantly greater in the grammatical sequences – a bilingual sentence superiority effect. These results not only provide support for shared syntax, but also reveal a fascinating ability of bilinguals to simultaneously connect words from their two languages with these shared syntactic representations. We propose that language-independent parts-of-speech provide the input for an initial approximate syntactic parse.

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10:40-10:55 AM (318)

Recently Arrived Children and Adult Immigrants Learning the Majority Language: The Effect of Aptitude, Working Memory, Exposure and Anxiety. AMELIA LAMBELET, City University of New York - We investigate the factors explaining success in learning English by newly arrived adult and children immigrants. Two types of factors are considered: cognitive abilities (aptitude, working memory) and contextual and affective factors (exposure, anxiety). Participants are 50 children (mean age 10) and 50 parents. Their English proficiency is measured by a listening comprehension test, a verbal fluency test, and an oral narrative. In this talk we focus on the lexical diversity of the narratives (Guiraud). Linear regression models were run on both groups using LLAMA, working memory, length of stay, exposure and anxiety as predictors. Both linear models were significant (Adult group: F=6.9, p>.001, R²=0.72, Adjusted R²=0.61; Children group: F=6.3,p>.001, R²=0.70, Adjusted R²=0.59). In the adult group, LLAMA_B (t=2.29,p>.05), LLAMA_D (t=2.46,p<.05), exposure (t=3.67,p<.01) and anxiety (t=-2.31,p<.05) are significant predictors. In the children group, LLAMA_B (t=2.33,p>.05), length of stay (t=2.73,p<.05) and anxiety (t=-2.71,p>.05) are significant predictors. These results confirm the differential effect of aptitude between adults and children and show that exposure and anxiety to speak in L2 are important for both groups.

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11:00-11:15 AM (319)

Sequential Suppression and Activation: Parallels Between Alphabet and Language Codes. DUŠICA FILIPOVIĆ ĐURĐEVIĆ, University of Belgrade, LAURIE BETH FELDMAN, University at Albany - We build our study from the finding that the cost of code switching reflects the longerterm level of inhibition before a switch and is more difficult in the Language2 to Language1 direction. We predicted the same asymmetry in alphabet switching with phonological ambiguity in Serbian (Feldman & Turvey, 1983) and tested this prediction by presenting participants with a single-alphabet block (containing words with unique phonological interpretation in a single alphabet) followed by a mixed-alphabet block (containing phonologically ambiguous and unambiguous versions of the same lexeme) in the lexical decision task. The cost of suppressing the irrelevant alphabet was only manifested when processing phonologically ambiguous stimuli that were words when read

as Cyrillic, revealing that Cyrillic was suppressed more strongly in the first (single alphabet) block than was Roman. Results mirror the asymmetry in the language switching literature, thus inviting a parallel between bilingualism and bialphabetism. Email: Dušica Filipović Đurđević, dusica.djurdjevic@f.bg.ac.rs

11:20-11:35 AM (320)

Using What's There: Bilinguals Adaptively Rely on Orthographic and Color Cues to Achieve Language Control. CHUCHU LI, University of California, San Diego, JULIE FADLON, Tel-Aviv University, TAMAR H. GOLLAN, University of California, San Diego, ANAT PRIOR, Haifa University (Presented by Chuchu Li) - Can bilinguals rely on novel and arbitrary cues to facilitate language switching? Spanish-English (S-E) and Hebrew-English (H-E) bilinguals read aloud mixed-language paragraphs, known to induce language intrusion errors (e.g., saying el instead of the), and switch words were either in black, just like all other words, or in red (i.e., color cues). For S-E bilinguals, written input is not rich in visual cues to language membership; for H-E bilinguals, rich cues are present (i.e., the two languages have different orthographies and are read in opposite directions). H-E bilinguals produced fewer intrusion errors than S-E bilinguals, suggesting that bilinguals recruit language intrinsic cues to facilitate switching. More importantly, color cues significantly reduced intrusions on switches to the dominant language to the same extent in both populations but facilitate switching to the nondominant language only in S-E but not H-E bilinguals. The results support highly adaptable and sensitive switching mechanisms: bilinguals rapidly exploit novel arbitrary cues to language membership when available and when task demands were high, but language intrinsic cues might be sufficient to allow for error-free performance in easy tasks. Email: Julie Fadlon, fadlonj@tauex.tau.ac.il

11:40-11:55 AM (321)

Bilingualism: How does Language Context Modulate Attentional Mechanisms? KALINKA TIMMER and ALBERT COSTA, Universitat Pompeu Fabra - How does our general attentional system manage with our constantly changing linguistic conversations? Specifically, do we adjust our attention depending on whether we are in a bilingual or a monolingual situation? This research is based on findings by Wu & Thierry (2013) that bilingual language context modifies inhibitory control. In a flanker task, they found enhanced inhibition when participants were in a bilingual instead of a monolingual context. This shows inhibition and language context interact. With EEG we explore whether language context also affects attentional mechanisms. The Attentional Network Task (ANT) task allows us to measure three types of attention: alerting, orienting and inhibition. During the ANT words were also presented in one language (Catalan) or in two languages (Catalan & Spanish) allowing us to investigate the effect of language context on attention. Language context modified attention for alerting and inhibition, but not orienting. Specifically, the bilingual context led to a greater P3 amplitude, which is associated with greater availability of attentional resources. Thus, a bilingual context can enhance attention towards non-linguistic information. Email: Kalinka Timmer, kalinkatimmer@gmail.com

Poster Session I Thursday Evening Room 517 B Viewing 4:00-7:30 PM, Author Present 6:00-7:30 PM

POSTER SESSION I

6:00-7:30 PM (1001)

Without Physical Salience, Emotional Target Pictures Do Not Break Through the Attentional Blink. MINWOO KIM, ALISON LOBO, and JAMES E. HOFFMAN, University of Delaware (Sponsored by James Hoffman) - Emotional pictures appear to intrude into awareness, even when attentional resources are scarce. For example, when an emotional picture appears as the second target (T2) in the attentional blink paradigm (AB), it breaks through the blink leading to higher detection accuracy compared to neutral targets. We show that this "emotional breakthrough" depends on the emotional picture being *physically salient* relative to the filler pictures in the stream and disappears when physical salience is eliminated. In this study, we presented targets that were emotional (e.g., medical trauma and aggressive animals) or neutral (e.g. people and animals) as T2's in a stream of inverted filler pictures that were physically similar. Large and comparable blinks occurred for both negative and neutral T2's. This shows that emotional salience alone does not allow target pictures to break through the blink.

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6:00-7:30 PM (1002)

An Examination of the Factors That Contribute to the Continued Influence of Misinformation. IRENE P. KAN, ELI J.V. MIKKELSEN, ANNA B. DRUMMEY, KENDRA ANDREW, and MARIA ABDUL-MASIH, Villanova University - The term "continued influence effect" (CIE) refers to the phenomenon that information continues to affect behavior and beliefs even when that information is later discredited. It is well established that the CIE is extremely robust, in that it can be reliably induced and is extremely difficult to eliminate. In order to investigate the factors that underlie the CIE, we manipulated the wording of a correction statement and the extent to which the misinformation is critical or peripheral to the development of the narrative. We found that offering an alternative that replaced the outdated information is crucial to the elimination of the CIE. In addition, we found that while it is possible to eliminate the CIE when the misinformation is peripheral to the plot of the story, the CIE persists when the misinformation is central to the resolution of the narrative.

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6:00-7:30 PM (1003)

The Impact of Olfactory Cues on Attention: The Case of Reverse Stroop Interference. JON HAM, *Temple University*, CHRISTOPHER KOCH, *George Fox University* (Sponsored by Chris Koch) – Ham and Koch (2019) found that an odorant could influence interference on a modified Stroop task. This study was conducted to examine the impact of olfactory cues on reverse Stroop interference. Across three experiments, participants completed a modified reverse-Stroop task in which they identified a word (strawberry, lime, lemon) in different color fonts (red, green, yellow). Although the words were fruit names instead of color names, each word had some degree of association with a particular color (e.g., lime and green). In Experiment 1, congruent and incongruent trials were presented without an odorant. No differences were found between congruent and incongruent trials (t(28) = .63, p > .05; d = .12). Experiment 2 consisted of the same task; however, an orange odorant was added to the room. RTs were faster for congruent trials than incongruent trials (t(17) = 4.15, p < .001; d = .98). Lavender odorant was used in Experiment 3 to test whether the RT differences in Experiment 2 were influenced by the presence of a related odorant or any odorant. No differences were found between conditions (t(27) = 1.89, p > .05; d = .36). The results indicate that a task-related odorant can impact word identification in a modified Stroop task. Email: Chris Koch, ckoch@georgefox.edu

6:00-7:30 PM (1004)

Bypassing the Central Bottleneck: Demonstrating the Inherent Automaticity of an Ideomotor-Compatible Task. MORGAN LYPHOUT-SPITZ and FRANÇOIS MAQUESTIAUX, Université Bourgogne Franche-Comté, ERIC RUTHRUFF, University of New Mexico (Presented by Morgan Lyphout-Spitz) - A bottleneck generally limits central processing to only one task at once, thus producing stubborn dual-task interference. In the search for exceptions, researchers have claimed that this limitation can be bypassed so long as both tasks are ideomotor-compatible (i.e., tasks for which the stimulus resembles sensory feedback from the response). However, if ideomotor tasks are truly automatic, bypassing should be possible even when only one task is ideomotorcompatible. In a PRP experiment, we tackled this issue. To probe for bypassing, we used a set of converging measures -PRP effect, reversal rate, RT2 comparison between dual-task and single-task conditions, RT1:RT2 correlations. We also simulated dual-task performance based on single-task trials. Even though PRP effects did not completely disappear when one task was ideomotor-compatible, all indicators pointed towards bypassing for almost all participants. We conclude that the mere presentation of a stimulus can immediately activate its associated response code sufficiently to permit bottleneck bypassing.

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6:00-7:30 PM (1005)

Electrophysiological Evidence for Facial Attractiveness Perception Without Attention. BIANCA ROBISON, ANNABELL SCHULZ and MEI-CHING LIEN, *Oregon State University*, ERIC RUTHRUFF, *University of New Mexico* – Jung et al. (2011) reported behavioral evidence that the

Posters 6:00-7:30 PM (1006) - 6:00-7:30 PM (1009)

perception of facial attractiveness requires central attentional resources. We evaluated this conclusion using more sensitive electrophysiological measures. Participants first made an attractiveness rating on faces to validate the assigned level of attractiveness (low vs. high). They then performed a dual-task experiment. The purpose of Task 1, a tone/noise discrimination, was to use up central attentional resources. For Task 2, one attractive face and one less-attractive face were presented sideby-side and participants indicated the location of the more attractive face. The stimulus onset asynchrony (SOA) between the two tasks was 50, 200, or 1000 ms. The N2pc was used to track the allocation of spatial attention over time. Although we observed the usual slowing of responses at short SOAs, the N2pc elicited by the more attractive face was similar across SOAs. We conclude, contrary to previous behavioral studies, that attractiveness can be judged automatically, even while participants are still engaged with Task 1.

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6:00-7:30 PM (1006)

Electrodermal Orienting Response to Verbal Suggestions. ENIKO KASOS, KRISZTIAN KASOS, ZOLTAN KEKECS, LUCA CSIRMAZ, ANNA VERES-SZÉKELY, and KATALIN VARGA, Eötvös Loránd University (ELTE), (Sponsored by Balazs Aczel) - Automatic processes have long been thought about as bottom up processes, but recent studies with verbal suggestions, have been challenging this idea considering a top down aspect of automatic processes. The aim of this study is to examine if simple verbal suggestions have any effect on the orienting response, measured by skin conductance. Exposing participants to two types of suggestions in an auditory oddball paradigm condition, we hypothesized, that suggestibility is influenced by conditions and thus suggestions moderate responses. Results showed interaction between suggestion and orienting response as well as among suggestions, condition and suggestibility. In conclusion, the influence of verbal suggestions on a person's reaction is influenced by the situation, indicating the need for careful communication in different situations, if not all. Our results are highlighting the usefulness of suggestive communication techniques in clinical and medical settings since both bottom up and top down influences seem be involved in physiological responses.

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6:00-7:30 PM (1007)

The Role of Medication Use and Trait Anxiety on the Cognitive Components of Emotional Facial Processing: An Event-Related Potentials Study. DENIS VAILLANCOURT, Laurentian University, ANNIE ROY-CHARLAND, Université de Moncton, JOËL DICKINSON, Laurentian University (Sponsored by Annie Roy-Charland) – Higher levels of anxiety have consistently been associated with an increased attentional bias to threat. This is evident in a Rapid Serial Visualization Presentation (RSVP), with the outcome resulting in a decrease in Attentional Blinks (AB) (i.e., hypervigilance). Of interest, if the second stimulus in a sequence carries emotional value, this AB can be attenuated for individuals with high anxiety. Furthermore, there has been evidence that certain anxiolytic

medications can attenuate this threat-bias. Specifically, acute Selective-Serotonin Reuptake Inhibitors (SSRI) administration has previously resulted in threat-bias reduction. Thus, the current study aimed to examine the impact of anxiety-reducing medication when attentional resources are limited. Using RSVP combined with Event-Related Potentials (ERP), we compared those with differing levels of anxiety and medication use on an attentionally demanding task. The effects of SSRIs were explored in order to understand the nature of emotional processing. Results are discussed with regards for their implications of specific cognitive ERP components directly related to heightened anxiety.

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6:00-7:30 PM (1008)

Is Anthropomorphism an Automatic Process? Evidence from Affective Priming Tasks. YI FENG, JENNIFER H. COANE, and KAI CHANG, Colby College, MICHAEL DACEY, Bates College (Presented by Yi Feng) (Sponsored by Jen Coane) - Anthropomorphism refers to a bias in which people attribute humanlike characteristics, intentions, and emotions to nonhuman agents. Most studies to date have used explicit measures to examine such attitudes. Thus, the role of automatic process in this phenomenon remain unclear, although there are theoretical reasons suggesting that it could be an automatic process. In an affective priming task with happy- or sad-appearing animal faces as primes and emotional words as targets, older and younger adults categorized the words as either positive or negative. In general, congruent face valence/word valence pairings were recognized more accurately and faster than incongruent pairings. Imposing a speeded response deadline eliminated the effect, suggesting it is driven by slower response times. In an additional manipulation, the target was degraded, a manipulation that yields slower latencies and can increase reliance on the prime. Overall, although anthropomorphic responding can be detected in priming tasks, the effect emerges most robustly under conditions that allow for greater accumulation of evidence and not at shorter deadlines most likely to promote rapid, automatic responding. Email: Yi Feng, yfeng20@colby.edu

6:00-7:30 PM (1009)

Dependence of the Accessory Stimulus Effect on Stimulus Intensity and Timing: A Startle Inhibition Study. TERRY D. BLUMENTHAL and APARNA SIVAKUMAR, Wake Forest University - When a visual target stimulus is paired with an intense acoustic stimulus, the reaction time to the target is reduced, a phenomenon called the Accessory Stimulus Effect (ASE). The intense acoustic stimulus can elicit a startle response, which can be inhibited by a preceding weaker acoustic stimulus. In this study we used a simple two-color Stroop test and had participants (N = 46) press a button indicating the color of the text for congruent and incongruent trials. Pairing the target word with an intense startle-eliciting stimulus resulted in speeded reaction time (ASE) on incongruent trials, illustrating a floor effect on congruent trials. Adding a prepulse 120 ms before the startle stimulus abolished this ASE and presenting the prepulse alone 120 ms before word onset further slowed reaction time. This shows that a weak acoustic pulse can interfere with processing of target words and can also prevent the ASE from occurring.

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6:00-7:30 PM (1010)

Effects of a Neutral Auditory Warning Signal on Performance of a Two-Choice Spatial Reaction Task. TIANFANG HAN and ROBERT W. PROCTOR, Purdue University (Sponsored by Robert Proctor) - Posner et al. (1973) reported that, at short foreperiods, a neutral warning tone reduced reaction times (RTs) in a visual two-choice task while increasing error rates. This speed/accuracy tradeoff was evident for compatible and incompatible stimulus-response mappings. In the present Experiment 1, participants performed the same two-choice task as in Posner et al.'s study without RT feedback. Results showed no evidence of speed/accuracy tradeoff. In Experiment 2, when feedback was provided after each response, RT approached that of Posner et al., and a speed/accuracy tradeoff was found for the 50-ms foreperiod. Improvement in both speed and accuracy was evident for the 200-ms foreperiod compared to the 50ms foreperiod. Also, the 50-ms foreperiod showed a larger RT reduction for the compatible than incompatible mapping compared to the no-alert condition, whereas the 200-ms foreperiod showed a larger RT reduction for the incompatible mapping. The results implicate both response criteria and enhanced information processing.

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6:00-7:30 PM (1011)

Stroop Interference with Sesame Street Characters. CHRISTOPHER KOCH, George Fox University - Although the Stroop task is a robust task, making it a useful assessment of automatic processing, it is also associated with reading ability. This limits the utility of the Stroop task to children with a sufficient reading level. Non-word Stroop tasks may be alternatives for non-readers or beginning readers. For example, Prevor and Diamond (2005) showed that Stroop interference could be obtained using pictures (e.g., heart, frog). This study explored using Sesame Street characters to create Stroop interference. Elmo, Kermit, and Cookie Monster were shown in red, green, and blue to first through fourth grade students. RTs for color incongruent trials were more than 100 msec slower than color congruent trials indicating Stroop interference (d = .98). Therefore, this modified version of the Stroop appears to be an acceptable picture-based measure of automatic processing in elementary age students.

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6:00-7:30 PM (1012)

Is Inhibition of Return at the Midpoint of Simultaneous Cues Input-Based or Output-Based? RALPH S. REDDEN (Graduate Travel Award Recipient), *Dalhousie University*, MARYAM KAVYANI, *Shahid Beheshti University*, JOHN CHRISTIE and RAYMOND M. KLEIN, *Dalhousie University* (Sponsored by Ray Klein) – Inhibition of return (IOR) refers to slower reaction times (RTs) to targets presented at previously attended locations. A key factor in determining the nature of Thursday Evening (

the inhibitory effect is the state of the reflexive oculomotor system (Klein & Redden, 2018), where output-based IORgenerated when the reflexive oculomotor system is activatedis characterized by a bias against responses toward the inhibited region while input-based IOR-generated when the reflexive oculomotor system is suppressed-seems to delay covert orienting to stimuli presented to the inhibited pathway. Christie et al. (2013) inferred that the effect of IOR for both manual and saccadic responses following multiple cues may be operating at the centre of gravity of the grouped array rather than the local elements, suggesting that IOR is due to population coding in the oculomotor pathways (e.g., the superior colliculus). We sought to determine whether the effect at the centre of gravity of multiple cues is of the input- or output form. Across two experiments, we probed responding with a discrimination target to measure speed and accuracy following single- and multiple-item cue arrays. Dissociations in the centre of gravity effect were found across the two forms of IOR. Email: Ralph Redden, rredden@dal.ca

6:00-7:30 PM (1013)

The Unique Effects of Relatively Recent Conflict on Attentional States. JACKSON S. COLVETT, LINDSAY M. NOBLES, JANELLI RODRIGUEZ, and JULIE M. BUGG, Washington University in St. Louis (Sponsored by Janine Jennings) - How much of our prior experience with conflict is considered when representing the conflict probability for a given context? There is currently evidence for at least two timescales of conflict accumulation affecting attentional states in conflict tasks (e.g., Stroop). Evidence of an "immediate" timescale can be seen through congruency sequence effects (Gratton et al., 1992) while evidence of a "long" timescale can be seen through proportion congruence effects (Bugg & Crump, 2012). The present, pre-registered experiments investigated the effects of an "intermediate" timescale (i.e., several preceding trials) on current attentional states. Experiment 1 (N = 61) manipulated the level of conflict experienced in the intermediate timescale for lists with equivalent overall proportion congruence. We found that conflict in the intermediate timescale had an effect above and beyond the immediate and long timescales. Experiment 2 (N = 60) found that this effect may depend on experience in the intermediate timescale being "experiencedefying". This research represents a first step in a growing research line exploring the interplay of learning, memory, and attentional control.

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6:00-7:30 PM (1014)

The Metacognition of Attention: Using Self-Scheduled Breaks to Improve Performance. TRISHA N. PATEL, University of Illinois at Urbana-Champaign, MARK STEYVERS, University of California, Irvine, AARON S. BENJAMIN, University of Illinois at Urbana-Champaign (Sponsored by Mark Steyvers) – Vigilance decrements are characterized as a reduction in performance on tasks requiring focused attention. We examined whether individual control over the timing and duration of breaks enhances performance. In Experiment 1, some subjects took 15s breaks when desired. Their performance was compared to subjects yoked to the same break schedule and to a group that experienced no breaks. There was no clear benefit of taking breaks. Experiment 2 replicated this null result even when subjects controlled the length of breaks. Experiment 3 provided subjects with full control of stimulus presentation, allowing them to control the onset of each trial. Under these conditions, those subjects outperformed a yoked control that experienced the task with a yoked total time but fixed rate. This result suggests that there are benefits to self-determining pacing of vigilance tasks, but they are only evident when the task forces subjects to consider the timing of events regularly. Email: Trisha N Patel, tpatel65@illinois.edu

6:00-7:30 PM (1015)

Electrophysiological Evidence for Contingent Response Inhibition. ANNE MOZEL and CHARLES L. FOLK, Villanova University - There is strong evidence that automatic processes associated with "front-end" attention allocation are contingent on top-down set for target-defining properties. There is also evidence that similar top-down contingencies hold with respect to "back end" response activation/inhibition. Specifically, behavioral evidence shows that response compatibility effects in the flankers paradigm can be reversed when the flankers appear in a color associated with a no-go response to the central target (Anderson & Folk, 2012), revealing response inhibition that is contingent on a top-down response set for color. The aim of the present study was to explore electrophysiological evidence for contingent response inhibition. Participants completed a go-no go flankers task in which flankers could appear in the go or no-go target color. Behavioral results replicated positive compatibility effects with go-colored flankers and reverse compatibility effects with no-go colored flankers. Electrophysiological results revealed converging evidence for contingent response inhibition in both P3 and LRP components.

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6:00-7:30 PM (1016)

Dynamics of Attentional Focusing in the Eriksen Flanker Task. MATHIEU SERVANT, Université de Bourgogne Franche-Comté, GORDON D. LOGAN, Vanderbilt University - Eriksen and Eriksen (1974) explained the flanker compatibility effect in terms of response competition. A simplified version of the original flanker task, featuring a 1-to-1 mapping of stimuli onto responses, has become prominent in the literature. Compatible flanker trials present identical items (HHHHH), whereas incompatible trials present different items (HHSHH). The 1-to-1 mapping invites another strategy for performing the task. Subjects could first determine whether all the items are the same and focus attention on the central target only if they are not. Response times (RTs) would be longer for incompatible trials partly because they require the extra step of focusing attention. We tested this conditional focusing hypothesis by combining a 1-to-1 flanker task with a digit probe detection procedure. In half of the trials, the digit '7' appeared immediately after the response to the flanker display, at the target or a flanker location. Three experiments showed a V-shaped function of RTs to digits across locations that was not modulated by

flanker compatibility. These results refute the conditional focusing hypothesis, and support Eriksen and Eriksen's original interpretation of the flanker effect.

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6:00-7:30 PM (1017)

Trait-Level Sustained Attention Partially Mediates the Relationship Between Media Multitasking and Episodic Memory Retrieval. KEVIN P. MADORE, ANNA M. KHAZENZON, CAMERON W. BACKES, JONATHAN M. QI, and ANTHONY D. WAGNER, Stanford University - Trait-level differences in media multitasking and sustained attention may influence when individuals remember and when they forget. Emerging work hypothesizes that differences in the propensity to experience attentional lapses may mediate the relationship between media multitasking and episodic memory retrieval. To test this hypothesis, 80 young adults completed trait-level measures of sustained attention, media multitasking, and related constructs, along with a separate memory retrieval task. Using continuous and extreme groups approaches, higher levels of selfreported media multitasking and task-based commission errors on the gradual-onset continuous performance task (gradCPT) were significantly negatively related to task-based memory accuracy (d') on the retrieval task. Commission errors from the gradCPT significantly partially mediated the relationship between media multitasking and memory retrieval. Trait-level differences in ADHD and BIS-11 impulsivity did not explain the findings. These results indicate that trait-level differences in sustained attention may help to explain the relationship between media multitasking and episodic remembering. Email: Kevin Madore, madore@stanford.edu

6:00-7:30 PM (1018)

Expectation Out of Sync: Both Learning and Monitoring Processes Determine Anticipatory Saccades in Goal-Directed Action Control. CHRISTINA U. PFEUFFER, ANA-MARIA ROSCA, and JANINA LORENZ, Albert-Ludwigs-Universität Freiburg (Presented by Christina Pfeuffer) - Contingencies between our actions and their effects allow us to form bi-directional action-effect associations that guide our goal-directed actions. Simultaneously, these action-effect associations are the basis of anticipatory saccades towards the future locations of our actions' expected effects. The latency of these saccades is determined by the delay between action and effect. Here, comparing conditions in which action-effect delays were 100% versus 75% predictable, we found fewer anticipatory saccades towards future action effects when action-effect delays were less predictable (75%). Yet, a second experiment showed that anticipatory saccades were more frequent and occurred earlier in trials following infrequent (25%) rather than frequent action-effect delays (75%). Additionally, in infrequent trials with unexpectedly long action-effect delays, anticipatory saccades occurred earlier than in frequent trials with long action-effect delays. Thus, on a global scale, learning and, on a local scale, monitoring processes determine how attention shifts based on the future effects we expect.

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6:00-7:30 PM (1019)

Context-Specific Contingency Learning Under Low but Not High Memory Load. THOMAS G. HUTCHEON, IMMMANUEL ZION, and JULIANNE ARNOLD, Bard College - Stimulus-driven control refers to the idea that the efficiency of cognitive control varies as a function of stimulus experience. Evidence for this form of control comes from Stroop manipulations in which the proportion of congruent and incongruent trials varies as a function of a contextual dimension (e.g., location). Despite task instructions to ignore the word and name the color, the size of the congruency effect is consistently found to be smaller at mostly incongruent compared to mostly congruent locations. An alternative contingency leaning account proposes that these results are instead due to the predictive relationship between the irrelevant word dimension and the color response. To test this proposal, we look for evidence of location-based contingency learning in a color-word task and find that it operates under certain conditions. Specifically, we find context-specific contingency learning under low but not high memory load. These findings have important implications for theories of stimulus-driven control.

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6:00-7:30 PM (1020)

An Individual Differences Investigation of the Relation Between Life Event Stress and Working Memory Capacity. MATT E. MEIER, HALEY GOLLER, ANASTASIA HILLSGROVE, ALLYSON JONES, ALEXA SUMNER, LACEY RUTHERFORD, and NATALIA TORRES WONG, Western Carolina University (Presented by Matt Meier) - Klein & Boals (2001) provided evidence for a negative association between negative life event stress and working memory capacity (WMC). We attempted to replicate and extend this work by testing for the association between both total and recent (i.e., experienced within the last 6 months) negative life event stress and WMC and by also examining the potential roles of dispositional mindfulness, mind-wandering, and rumination in this association. To this end, we analyzed data from 356 subjects who completed the Life Experiences Scale, two shortened complex span tasks (to measure WMC), a Sustained Attention to Response Task that contained embedded valence thought probes, the Ruminative Response Scale, and the Five Facet Mindfulness Scale. We found no evidence for associations between negative life event stress and WMC, between negative life event stress and the overall propensity to mind-wander, or between negative life event stress and the sum of negativelyvalenced thoughts.

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6:00-7:30 PM (1021)

Attentional Control of Task Conflict in the Stroop Task. LUKE MILLS and SACHIKO KINOSHITA, *Macquarie University* (Sponsored by Sachiko Kinoshita) – In the Stroop task, there is a conflict between reading the word and naming the display colour. There are a number of sources of this conflict, including task, informational/response conflict. Accordingly, there are different mechanisms for controlling conflict. The present study aimed to determine which mechanism is responsible for control of the task conflict produced by colour unrelated words (e.g. ABBEY in red). Attentional control of the task conflict was manipulated in oral and manual Stroop tasks by altering the proportion of neutral trials (e.g. ##### in red). In both versions of the task, a high neutral proportion magnified the interference caused by the colour unrelated words. This provides evidence that a high neutral proportion reduced attentional control of the task conflict. RT distribution analysis and diffusion modelling showed that a high neutral proportion shifted the RT distribution towards slower RTs and increased the non-decision time parameter of the diffusion model. We use these results to argue that the mechanism responsible for the attentional control of the task conflict is early stage, disengagement of attention from the word stimulus.

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6:00-7:30 PM (1022)

An Examination of Age-Related Differences in Attentional Control by Systems Factorial Technology. CHENG-TA YANG, SHULAN HSIEH and CHENG-JU HSIEH, National Cheng Kung University, MARIO FIFIC, Grand Valley State University, YEN-TING YU and CHUN-HAO WANG, National Cheng Kung University - We conducted four experiments with redundant-target tasks to examine the age-related differences in workload capacity. In the discrimination-type redundanttarget tasks (Experiments 1-3), we replicated age-related capacity advantage; however, the differences were eliminated in a detection-type redundant-target task (Experiment 4). Our results supported the distractor inhibition account, which suggests that age-related differences were due to less efficiency in attentional control to resolve the response conflict when making discrimination decisions. Moreover, we conducted a simulation using a Poisson parallel interactive model, which assumes an inhibitory interaction between two parallel channels that is a result of a limited attentional capacity. The modelings results indicated the two key findings that may account for the age-related capacity differences: the older adults (1) processed the redundant targets with a higher decision criterion (i.e., more conservative in decision-making) and (2) exhibited a greater violation of context invariance. The extensive modeling analyses highlighted the effect of a decline in attentional control on age-related differences in workload capacity. Email: Cheng-Ta Yang, yangct@mail.ncku.edu.tw

6:00-7:30 PM (1023)

Providing Goal Reminders Eliminates the Relationship Between Working Memory Capacity and Stroop Errors. AUDREY V.B. HOOD and KEITH A. HUTCHISON, *Montana State University* (Sponsored by Keith Hutchison) – We examined whether goal maintenance explains higher working memory capacity (WMC) individuals' better performance within mostly congruent (MC) Stroop lists. Participants first completed the Automated Operation Span and were then assigned to either a true control, yoked control, or goal-reminder condition. During the Stroop task, the true control group received rest breaks every 60 trials, whereas the goal-reminder and yoked control groups stopped every 12 trials to vocalize either the task goal (i.e., "name the color not the word") or a rehearsed statement (i.e., "this fulfills my psych 100 requirement"), respectively. We regressed Stroop errors on group and WMC, comparing each group to the true control. For the goal reminder comparison, there was an interaction, such that WMC correlated with Stroop errors in the true control, but not in the goal-reminder condition. In contrast, for the yoked control comparison, there was only a main effect of WMC. Thus, providing goal reminders eliminates the relationship between WMC and Stroop interference.

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6:00-7:30 PM (1024)

Did You See That? I Did! A Cultural Comparison of Volitional Attention and Attentional Selection in Film. TAYLOR L. SIMONSON, Kansas State University, SHUNSUKE KUMAKIRI and RYOH TAKAMORI, Kyoto University, JOHN P. HUTSON, College of Wooster, YOSHIYUKI UEDA, Kokoro Research Center, JUN SAIKI, Kyoto University, LESTER C. LOSCHKY, Kansas State University (Sponsored by Jun Saiki) -During film viewing, eye-movements are largely disconnected from comprehension-large comprehension differences produce small eye-movement differences. However, giving film viewers a meaningful cognitive task, irrelevant to narrative comprehension, produces larger eye movement differences. Do such tasks make viewers utilize volitional attentional control (VAC)? VAC is cognitively demanding, as shown by decrements when under an executive working-memory (E-WM) load. Thus: 1) Is task-driven film viewing cognitively demanding? 2) Is VAC moderated by E-WM capacity? To answer these questions, we tracked participants' eyes while viewing film under different task goals and differing levels of E-WM load. Furthermore, we compared participants from Kansas and Kyoto, to determine whether cultural differences in attention persist during film viewing. We found significant effects for task, E-WM load, and culture on several eye movement measures. However, E-WM load performance was quite variable. Further analyses are investigating whether E-WM moderates the relationship between task and VAC during film viewing.

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6:00-7:30 PM (1025)

The Role of Executive Control in Divergent Thinking. BRIDGET A. SMEEKENS, University of North Carolina, Greensboro, MATTHEW E. MEIER, Western Carolina University, PAUL J. SILVIA, University of North Carolina at Greensboro, THOMAS R. KWAPIL, University of Illinois, MICHAEL J. KANE, University of North Carolina at Greensboro (Sponsored by Michael Kane) - Do measures of executive control predict divergent thinking performance? According to the literature, there doesn't seem to be a consistent answer, potentially due to the myriad ways the two constructs are defined and measured. In a large-scale exploratory study, we used multiple measures of working memory capacity, mind wandering, attention restraint, attention constraint, and divergent thinking to create latent variables and test the relationships among them. We were particularly interested in how the executive control measures would predict divergent thinking, which was measured using two versions of the Alternative Uses Task (brick and knife). In line with common practices, multiple raters scored responses on the Alternative Uses Task using the Consensual Agreement Technique.

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6:00-7:30 PM (1026)

The Influence of Irrelevant Visual Distractors on Eye Movement Control in Chinese Children with Autism: Evidence from the Remote Distractor Paradigm. VALERIE BENSON, University of Central Lancashire, LI ZHANG, GUOLI YAN, LI ZHOU, and LAN ZEBO, Tianjin Normal University (Presented by Valerie Benson) - The current study examined eye movement control in autistic (ASD) and typically developing (TD) Chinese children. Simple targets (small squares) were presented in isolation, or with a central, parafoveal, or peripheral distractor (small circles). Sixteen ASD (47-81 months) and nineteen age and IQ-matched TD children, 51-74 months) were instructed to look to the target as accurately and quickly as possible. Both groups made high proportions (40%) of errors, where they looked first towards the distractor. For trials where the children looked towards the target with their first eve movement, both groups showed a remote distractor effect (RDE), whereby latencies (the time taken to initiate an eye movement towards the target) were longer for distractor trials compared to single target trials. One group difference showed that central distractors had a greater effect in the ASD compared to the TD group, indicating evidence for possible atypical voluntary attentional control in ASD.

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6:00-7:30 PM (1027)

Go/Nogo Task Demonstrates Individual Differences in Behaviorally Inhibited Temperament. MARIE SHUTER, IRENE P. KAN, and MEGHAN D. CAULFIELD, Villanova University (Sponsored by Irene P. Kan) - Avoidance, withdrawal and reactivity is seen in post-traumatic stress disorder (PTSD) and behaviorally inhibited temperaments (BI). These common characteristics may be representative of cognitive risk factors present before a trauma, enabling understanding of the cognitive mechanisms underlying who develops PTSD. Given that those with PTSD show decreased accuracy in responsive inhibition tasks, we investigated whether the Go/NoGo task was sensitive to individual differences in BI. Thirty young adults completed self-report measures of BI and a Go/NoGo task, consisting of 85% "Go" and 15% "No-Go" trials. After controlling for response time and state anxiety, response accuracy for the Go/NoGo task declined as BI increased (r(28)= -.53, p=.003), indicating poorer response inhibition in participants self-reporting high BI. These results are similar to what has been reported in PTSD, suggesting that individual differences in response inhibition may exist prior to the onset of PTSD.

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6:00-7:30 PM (1028)

Characterizing the Interplay Between Learning and Attention Across Neurodevelopmental Conditions: A Multiple Object-Tracking Study. DOMENICO TULLO, McGill University, JOCELYN FAUBERT, Université de Montréal, ARMANDO BERTONE, McGill University (Sponsored by Susanne Jaeggi) - The current study investigates whether learning on a Multiple Object-Tracking (MOT) task differs across diagnostic profiles. We examined whether intelligence, our proxy for cognitive capability, and/or diagnostic profile: Autism, ADHD, Intellectual Disability (ID), predicted learning on daily MOT performance across 15 sessions. Participants (N=83; M_{ape} =13.51) with a diagnosis of either Autism (n=32), ADHD (n=35), or ID (n=16) visually tracked 3 of 8 spheres for 8 seconds. Performance improved by 105% from the first to last day of testing across all groups. A latent growth model revealed that day-one performance was predicted by intelligence, and the rate of change, characterized by a linear trend, was predicted by diagnostic profile. Individuals with autism demonstrated a greater learning trajectory (i.e., rate of change) compared to ADHD and ID, whereas individuals with ID demonstrated a significantly lower rate of change compared to Autism and ADHD. These unique trajectories are indicative of distinct learning preferences specific to diagnostic profiles for individuals with and without deficits in attention. Therefore, a description of an individual's attention is necessary when characterizing learning on a case-by-case basis.

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6:00-7:30 PM (1029)

Is Perception the Missing Link Between Creativity, Curiosity and Schizotypy? Evidence from Spontaneous Eye-Movements and Responses to Auditory Oddball Stimuli. MADELEINE GROSS, DRAULIO ARAUJO, and JONATHAN SCHOOLER, University of California, Santa Barbara - In this study (N=88), we investigate whether individual differences in perceptual encoding explain variance in schizotypy, creativity, and curiosity using an active auditory oddball task and a free viewing eye-tracking paradigm. Creativity is measured with the figural portion of the TTCT and two self-report scales. Schizotypy and curiosity are measured using the Magical Ideation Scale and Epistemic Curiosity Scale, respectively. We find that performance-based creativity is associated with increased reaction time to the rare tone in the oddball task while being positively associated with the number and duration of fixations in the free viewing task. Schizotypy, on the other hand, shows a negative trend with the number and duration of fixations. Both creativity and curiosity are positively associated with explorative eye movements: the number of unique regions visited and Shannon entropy. We further explore these relationships by comparing saliency maps; we find significant differences in salience attribution for individuals high versus low in creativity and curiosity, but not for schizotypy. These findings may suggest a perception-based link between creativity and curiosity, but not schizotypy. Implications are discussed. Email: Madeleine Gross, madeleine.gross@psych.ucsb.edu

6:00-7:30 PM (1030)

Apathetic (But Unimpulsive) Psychopaths: Exploring the Relations Among Psychopathy, Motivation, and Cognitive Control. CAMERON STUART KAY and NASH UNSWORTH, University of Oregon (Sponsored by Nash Unsworth) - A number of studies have indicated that personality may influence one's use of a reactive or proactive control strategy. Despite a strong theoretical link and moderate evidence for the relation between the Dark Triad personality traits (i.e., Machiavellianism, narcissism, and psychopathy) and poor inhibitory control, dark personalities have yet to be assessed in the context of cognitive control. Undergraduate students (N = 171) completed the antisaccade task, as well as a measure of the Dark Triad and a task-specific measure of motivation. Using a linear mixedeffects model approach, we found that psychopathy was negatively associated with response accuracy, irrespective of whether a given trial was a prosaccade or an antisaccade trial. Furthermore, the impairment was greater for trials that allowed for greater task readiness and proactive control (i.e., those that had a greater delay between the appearance of the cue and the stimulus), reflecting an associated finding that psychopaths perform poorly because of a lack of motivation. Overall, our findings suggest that psychopaths are more inclined to use a reactive control strategy; a choice that can be attributed to apathy about task performance.

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6:00-7:30 PM (1031)

Attention Control Improves the Asvab's Prediction of Multitasking. CODY A. MASHBURN, JESSIE D. MARTIN, and RANDALL W. ENGLE, Georgia Institute of Technology (Sponsored by Mark Wheeler) - The Armed Services Vocational Aptitude Battery (ASVAB) is a personnel selection and screening tool employed by the U.S. military that primarily indexes acculturated learning (Roberts et al., 2000). We asked whether adding measures of "fluid" abilities would improve its ability to predict a complex cognitive process (i.e., multitasking). We administered a version of the ASVAB as well as a battery of fluid intelligence, attention control, processing speed, and multitasking tasks to 175 participants. Adding measures of attention control, particularly ones not based on reaction time difference scores (c.f., Draheim et al., 2019), drastically improved multitasking prediction. Further, modeling the relationships between latent variables of each construct revealed that an accuracy-based attention control and a processing speed uniquely predicted multitasking, while fluid intelligence and the ASVAB did not.

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6:00-7:30 PM (1032)

Absorption and Mindfulness Reflect Distinct Attentional Styles. MARCUS L. LEPPANEN and KYUNGMI KIM, *Wesleyan University* – Mindfulness and absorption may reflect different forms of attentional control. Mindful attention is focused on nonjudgmental processing of passing perceptions and thoughts. Absorption is the propensity to become deeply engaged with objects of attention. Both traits reflect high levels of attentional control, so how do they differ? We surveyed 237 participants to examine how trait mindfulness and absorption relate to attentional control over both internal and external stimuli, as well as self-directed introspection. We found that nearly all of the measured variables were significantly correlated. It was noteworthy that mindfulness and absorption were negatively correlated. Regression analyses revealed that mindfulness was significantly predicted by higher levels of topdown attentional control over external stimuli, self-reflection, and insight. Absorption was predicted by lower levels of topdown attentional control over external stimuli, higher levels of top-down control over internal thoughts, higher levels of self-reflection, and lower levels of insight. Mindfulness and absorption likely reflect distinct approaches to attending to the external environment and our own mental worlds.

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6:00-7:30 PM (1033)

Individual Differences in Baseline Pupil Size: Why Lighting Conditions Matter. JASON S. TSUKAHARA and RANDALL W. ENGLE, Georgia Institute of Technology (Sponsored by Randall Engle) - At least one researcher has had difficulty replicating our findings that larger pupils are associated with higher working memory capacity and fluid intelligence. However, these studies had a small mean and reduced variability on baseline pupil size compared to what we found. We reanalyzed our data using a bootstrap procedure of drawing subsamples with a reduced variability on baseline pupil size, similar to studies that failed to replicate. The results suggest that the probability of obtaining the original correlation of r = .24 and detecting a significant p < .05 effect between pupil size and working memory capacity with this reduced variability is very low. We also conducted an experiment to test whether the pupil size and working memory capacity relationship goes away in bright lighting conditions. Our findings suggest that the failed replications may be due to a reduced variability on baseline pupil size due to bright lighting conditions.

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6:00-7:30 PM (1034)

Cognitive Differences Between 'Gamers' and 'Non-Gamers': Assessing Visual Attention. PETER R. MALLIK, JORDAN MACKAY, HANNAH OUTEN, TALYAH FOGLE, JESSICA WILSON, SAVANNAH LEWIS, and MITCHELL METZGER, Ashland University (Sponsored by Mitchell Metzger) - In recent years, a number of studies have demonstrated that individuals who are video game players outperform non-video game players on various cognitive tasks (Bediou et al., 2018; Green & Bavelier, 2003; Li et al.,, 2016). However, this effect is not always observed (Mack et al., 2016). When the effect is found, it is shown in both baseline measures of cognitive performance and interventions (Bediou et al., 2018). In order to address these inconsistencies, seventy-four undergraduates completed different measures of visual attention, and participants were split into "heavy-gamers", "light-gamers", and "non-gamers" groups. We found significant differences with "heavy-gamers" outperforming the other groups in a visual search task and a Posner cueing task in reaction time but not in accuracy. These

data suggest that gaming is associated with improved visual attention performance, but this might be restricted to certain visual attention tasks.

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6:00-7:30 PM (1035)

The Impact of Auditory Distraction on Reading Comprehension: An Individual Differences Investigation. HAN HAO and ANDREW R.A. CONWAY, Claremont Graduate University (Sponsored by Kathy Pezdek) -Background noise disrupts attention and impairs performance on cognitive tasks, but the degree to which noise is disruptive may depend on the task and the individual. Previous research suggests that a perceptually difficult task may shield attention from distractions, and that this "shield effect" is moderated by individual differences in working memory capacity (WMC). Here we examined the effect of auditory distraction on reading comprehension as a function of perceptual difficulty, type of auditory distraction, and WMC. Results indicated a main effect of perceptual difficulty, in which higher perceptual difficulty increased comprehension performance, and a main effect of distraction, in which content-related distraction significantly impaired comprehension performance. However, the auditory distraction effect did not vary as a function of perceptual difficulty or WMC. Overall, contrary to previous research, the results indicate neither a shield effect of perceptual difficulty against auditory distraction nor a relationship between the shield effect and WMC.

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6:00-7:30 PM (1036)

Attention Control Is a Unitary Concept When Measured with Accuracy-Based Tasks. CHRISTOPHER DRAHEIM (Graduate Travel Award Recipient), JASON S. TSUKAHARA, JESSIE D. MARTIN, CODY A. MASHBURN, and RANDALL W. ENGLE, Georgia Institute of Technology (Sponsored by Randall Engle) - Attention control tasks such as the Stroop and flanker do not intercorrelate as strongly as researchers expect, leading some to conclude that attention control is not a unitary concept. We argue instead that the lack of a strong correlation is primarily methodological - reaction time and difference score tasks are often poorly suited to individual differences investigations due to unreliability, restricted between-subject variance, and sensitivity to speed/accuracy interactions. We tested 404 subjects on existing, modified, and new tasks designed to measure attention control. Results show that performance on accuracy-based and non-difference score measures were reliable, formed a coherent latent factor, had strong associations to other cognitive measures, and fully mediated the relationship between working memory capacity and fluid intelligence. Crucially, we administered processing speed tasks in a follow-up study (N = 173), and processing speed did not account for these findings. These results provide support that attention control is unitary.

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6:00-7:30 PM (1037)

The Influence of Resource Demands on Switch-Induced Reduction in Memory Selectivity. HYEJIN J. LEE and YANG SEOK CHO, Korea University (Sponsored by Yang Seok Cho) - When subsequent memory is tested for stimuli that are presented during task-switching, switching task sets, rather than repeating, increases memory for distractors but impairs memory for targets (Richter & Yeung, 2012). Chiu and Egner (2016) claimed that the protracted activation of previous task sets decreases memory selectivity by showing that memory did not increase on switching than repeated trials for always irrelevant distractors. However, memory increase did not simply disappear, but a cost occurred for which they accounted as switching trials being more resource demanding. To examine if resource consumption interferes with memory encoding, resource demands were manipulated. The low resource group responded to perceptual characteristics, and the high resource group responded to word semantics. While the high group performed poorer in task-switching, their memory was higher without having a cost on switching trials. These findings raise questions on the account that the cost occurred due to resource demands.

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6:00-7:30 PM (1038)

Eye Movements During the Ax-Cpt Predict Modes of Cognitive Control. JASON F. REIMER, ANTHONY SIERRA, ALEXIS PEREZ-MARTINEZ, KYLE MOBLY, and ANDREW RIVERA, California State University, San Bernardino - Two modes of control can be utilized during cognitive control tasks (Braver, 2011). Specifically, when performing the AX-CPT use of a proactive strategy involves representing and actively maintaining the cue in working memory so that a response can be prepared for the probe. In contrast, with a *reactive* strategy, goal information associated with the cue is reactivated when the probe is presented. The purpose of the present study was to further examine how these two modes of control operate by recording eye movements during the AX-CPT. A modified version of the AX-CPT was utilized in which cues and probes appeared on opposite sides of a computer screen. In one condition, the location of probes (i.e., top or bottom) was correlated with cue type (i.e., an 'A' vs. non-'A' cue), while in the other condition it was not. Results showed that when cue type and probe location were correlated, participants adopted a more proactive mode of control. More importantly, however, we found that the total amount of time participants spent looking at the cue's location during the cue-probe delay predicted the degree of proactive control. The implications that these results have on the operation of control strategies will be discussed. Email: Jason F. Reimer, jreimer@csusb.edu

6:00-7:30 PM (1039)

Worst Performance Rule, or Not-Best? It Depends on the Ability Construct. MATTHEW S. WELHAF and BRIDGET A. SMEEKENS, University of North Carolina at Greensboro, MATT E. MEIER, Western Carolina University, PAUL J. SILVIA, University of North Carolina at Greensboro, THOMAS R. KWAPIL, University of Illinois at Urbana-Champaign,

MICHAEL J. KANE, University of North Carolina at Greensboro - The Worst Performance Rule (WPR) refers to the finding that people's cognitive abilities correlate more strongly with their longest than their shortest reaction times (RTs) in simple tasks. A recent meta-analysis (Schubert et al., 2019) suggested, however, that the WPR be renamed the "not-best" performance rule: Whereas people's shortest RTs weakly predict ability, their longest RTs don't predict ability any better than their mean RTs do. The present study re-analyzed a large dataset (N > 450; Kane et al., 2016) to test for WPR vs. not-best performance rules across 6 RT tasks in relation to two ability constructs: Working memory capacity (WMC) and propensity for task-unrelated thoughts (TUTs). Regression and latent-variable analyses, based on ranked-binning and ex-Gaussian methods, found that WMC variation followed a not-best performance rule but TUT propensity followed a WPR. The WPR may only arise in relation to abilities linked closely to sustained attention (and its failures).

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6:00-7:30 PM (1040)

Adaptivity of Cognitive Metacontrol. VERA N. MEKERN, ZSUZSIKA SJOERDS, and BERNHARD HOMMEL, Leiden University (Sponsored by Bernhard Hommel) - In a dynamic world we need to flexibly consider alternatives in some cases and show persistence in reaching goals at other times. Individuals differ in the extent to which they are more persistent or flexible in terms of cognitive control, or in what we term their trait metacontrol bias. However, individuals are also able to adjust their metacontrol states to volatile environmental demands, suggesting variability in their metacontrol bias. We aimed to measure generalizability and intraindividual variability of metacontrol biases in a set of different tasks that all required a tradeoff between persistence and flexibility and manipulated the metacontrol bias by systematically changing the volatility in a multi-arm bandit task environment. Findings suggested that the persistence versus flexibility tradeoff did not generalize over different tasks, but that individuals adapt their metacontrol bias from task to task, and within a task with systematic adjustments in volatility. We concluded that it is important that this adaptivity of metacontrol state biases, both between tasks and within subtly varying task environments, could reflect adaptivity in real life environments and should be taken into account in cognitive control studies.

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6:00-7:30 PM (1041)

Delegating Cognitive Control to Contextual Features. ROEL VAN DOOREN, ROBERTA SELLARO, and BERNHARD HOMMEL, *Leiden University* (Sponsored by Wilfried Kunde) – Cognitive control is traditionally assumed to consist in topdown focusing on relevant task components. More recently, functional and neural insights suggest that control rather emerges from the dynamic interplay of two at least partly antagonistic metacontrol systems that propagate persistence (top-down focus on task-relevant cognitive processes) and flexibility (the relaxation of such top-down constraints). Within recent years, initial evidence has been described proposing that such abstract (meta-)control parameters can become conditioned to contextual information. Interestingly, however, evidence in favor of such context-state binding hypotheses has merely been restricted to so-called near-transfer conditions, in which test tasks are almost identical to those used to initially establish the bindings effects. Our study goes beyond these observations by addressing the issue of far-transfer. The observed effects open new doors for our understanding of how the cognitive system delegates control to contextual features and raise many interesting questions regarding the specificity of (meta-)control parameters.

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6:00-7:30 PM (1042)

Cross-Cultural Differences in Metacontrol Policies: Evidence from Task-Switching. SASKIA HEIJNEN and ROBERTA SELLARO, Leiden University, FRANCESCA CIARDO, IIT Central Research Labs Genova, MA KE, Southwest University, IRING KOCH, RWTH Aachen University, AGNIESZKA WYKOWSKA, IIT Central Research Labs Genova, NACHSCHON MEIRAN, Ben Gurion University of the Negev, BERNHARD HOMMEL, Leiden University - According to the metacontrol state model, cognitive control can be affected by metacontrol states that vary between two poles: extreme persistence and extreme flexibility. These are respectively characterized by a strong versus weak top-down influence of the current action goal; high versus low selectivity and goal maintenance; and strong versus weak mutual competition between alternative representations. Interestingly, previous research has suggested that relatively stable biases towards either persistence or flexibility can be created by certain longterm influences, amongst which culture. To investigate this, we compared cognitive flexibility (color-shape task-switching) across four different nationalities (German, Italian, Dutch, and Chinese; N=60 in each group). The results indicated a modest effect of nationality on task-switching performance in the direction consistent with the model: Individualist cultures (Germans and Dutch) made more use of preparation time than collectivistic cultures (Chinese and Italians). Switching costs and the congruency effect were not affected by nationality. Email: Saskia Heijnen, s.heijnen@fsw.leidenuniv.nl

6:00-7:30 PM (1043)

Directed Forgetting Reduces Proactive Interference Within Working Memory Beyond a Baseline Encode-Only Condition. SARA B. FESTINI, University of Tampa – Previous research has indicated that directed forgetting performed on the contents of working memory successfully reduces the amount of proactive interference for to-be-forgotten memoranda relative to to-be-remembered memoranda (Festini & Reuter-Lorenz, 2014). The present experiment implemented an identical directed forgetting within working memory paradigm, with an additional comparison condition: proactive interference for words that were previously encoded but that did not receive either a forget cue or a remember instruction. Critically, the level of proactive interference for these encoded-only items did not significantly differ from the level of proactive interference for to-be-remembered items, and the level of proactive interference for to-be-forgotten items was significantly lower than that for both comparison conditions. Thus, the present research provides support for the theory that directed forgetting instructions result in the differential attenuation or removal of targeted memory representations from working memory and that forget instructions do not simply curtail further processing after encoding.

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6:00-7:30 PM (1044)

Effects of Game-Based and Standard Executive Control Training on Cognitive and Academic Abilities in Elementary School Children. JULIA KARBACH and VERENA JOHANN, University of Koblenz-Landau - Executive functions (EF; working memory (WM), inhibition and flexibility) can be improved by training and gains in WM capacity can generalize to academic abilities. However, results of prior studies are inconsistent and mostly focused on WM training in children with learning difficulties. Evidence for typically developing children is rare and no study has investigated inhibition training, flexibility training or considered motivational factors. We compared effects of game-based and standard training regimens targeting WM, inhibition or flexibility. 153 typically developing children (mean age=9.6 years, SD=0.8) performed pretest, 21 training sessions, posttest and follow-up after three months. They were randomized into one of six training groups or a control group. We found training gains in all training groups and higher self-reported motivation in the game-based compared to the standard training groups. There was domainspecific transfer to untrained EF tasks across all training groups. We also found greater performance improvements in reading ability in the game-based flexibility training group and the game-based inhibition training group compared to the control group. Transfer effects were still significant at follow-up. Email: Julia Karbach, karbach@uni-landau.de

6:00-7:30 PM (1045)

State Effects of Brief Mindfulness Meditation on Working Memory and Mind-Wandering. MICHAEL F.S. BARANSKI, Kent State University (Sponsored by Christopher Was) -Mindfulness meditation, frequently defined as non-judgmental attention to the present moment, has shown preliminary efficacy in benefitting working memory and decreasing mindwandering. It is currently unclear if working memory is improved or protected from decrement, what components of working memory (e.g., span, processing efficiency or accuracy) are impacted, if these effects are moderated by proneness to mind-wandering, and if a single session of mindfulness practice is efficacious. Over four experiments, the current study compared single sessions of mindfulness meditation (i.e., recordings of instructor-guided or self-guided practice) to active control groups on multiple measures of working memory and mind-wandering. Two of the four experiments are ongoing; preliminary results suggest that these types of brief mindfulness meditation protect working memory processing accuracy from decrement but do not improve working memory span nor decrease mind-wandering.

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6:00-7:30 PM (1046)

Mind Wandering and Working Memory Processing. PETER DIXON and SHUAINAN FANG, University of Alberta - We hypothesize that when mind wandering, people have reduced temporal focus, so that they are less able to distinguish recent events from more distant events. This was tested in a two-back working memory task in which participants decided whether or not an item was also presented two trials ago. Consistent with the hypothesis, mind-wandering participants were less able to distinguish items that had appeared two trials ago from those that had appeared three trials ago. The effect was larger with acoustically similar items, suggesting that on-task participants benefitted from distinctiveness. In general, the result support the view that mind-wandering participants fail to focus on the relevant previous trials.

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6:00-7:30 PM (1047)

Let's Go Bird Watching: A Working Memory Updating Game and Its Relationship with Other Executive Functions. NICHOLAS R. RAY and CHANDRAMALLIKA BASAK, University of Texas, Dallas (Sponsored by Chandramallika Basak) - Working memory (WM), a popular training tool, is argued to be composed of two components: storage (capacity) and executive functioning (updating). However, degree of probe-cue predictability also influences WM updating and cognitive gains from WM training (Basak & O'Connell, 2016). We designed an experimenter-developed WM updating game, called BirdWatch, and examined how this game relates to the 3 components of WM (updating, probe-cue predictability, and capacity) as well as with other components of executive function (shifting, inhibition), using Confirmatory Factor Analysis on 223 adults. A 4-factor (updating, capacity, shifting, and inhibition) model best-fitted the data (CFI > .9), providing evidence for independent, yet inter-related, executive functions. Importantly, performance on BirdWatch loaded significantly onto updating the factor (p < .001), supporting the validity of the BirdWatch Game as a WM updating task. Relationships between the four components of executive function, BirdWatch, and reasoning will also be discussed.

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6:00-7:30 PM (1048)

The Relation Between Mind Wandering and Perfectionism. EMILIE ELIZABETH CARON, University of Waterloo, JONATHAN SCOTT ANDREW CARRIERE, Bishop's University, DANIEL SMILEK, University of Waterloo (Sponsored by Derek Besner) - We examined the link between individual differences in the tendency to mind wander (i.e., engaging in task-unrelated thought) and individual differences in the personality trait of perfectionism. Prior work has shown that trait levels of mind wandering (MW) are related to trait levels of neuroticism and conscientiousness. While perfectionism is certainly related to both neuroticism (high levels of selfcriticism) and conscientiousness (high standards and goals), perfectionism is nevertheless considered a unique construct. Building on prior work, we sought to examine the relationship between mind wandering (MW) and perfectionism, and

to evaluate whether this relation holds over and above the established links between MW and neuroticism (Robison et al., 2017), and MW and conscientiousness (Giluk, 2009). Data from self-report measures indicate a unique relation between MW and perfectionism over and above that of MW and neuroticism and MW and conscientiousness, such that higher trait MW is associated with more perfectionism.

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6:00-7:30 PM (1049)

Conflict Evoked by Counter-Stereotypical Implicit Associations Is Processed by the Conflict Monitoring Mechanism like Stroop Stimuli. HANSOL RHEEM, AHRA KO, and D. V. BECKER, Arizona State University (Sponsored by Chris Blais) - Implicit association research has suggested that conflicts evoked by counter-stereotypical associations might be moderated by executive function (Amodio et al., 2004). Paralleling the implicit association research, cognitive psychologists have long postulated mechanisms that process conflicts elicited by multi-dimensional stimuli (such as the Stroop stimuli, e.g. the word "blue" printed in red ink), and that call for resources to resolve the conflicts. The current study tested whether implicit associations are handled by a mechanism similar to that which handles cognitive conflicts. In this study, participants categorized faces varying in gender, racial and facial expression (dimensions that often interfere with each other) while memorizing one or six digits (a working memory load manipulation). The results revealed conflict adaptation effects that were attenuated under higher working memory load. These results suggest that the conflict monitoring mechanism might also process conflicts evoked by implicit associations.

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6:00-7:30 PM (1050)

Dissociation Between Reaction Time and Pupil Dilation in the Stroop Task. RONEN HERSHMAN and AVISHAI HENIK, Ben-Gurion University of the Negev (Sponsored by Avishai Henik) - It has been suggested that the Stroop task gives rise to two conflicts: the information conflict (color vs. word meaning) and the task conflict (name the color vs. read the word). However, behavioral indications for task conflict (RT congruent condition longer than RT neutral condition) appear under very restricted conditions. We conducted Stroop experiments and measured RT and pupil dilation. The results show a clear dissociation between RT and pupil dilation. We found the regular RT pattern-large interference and small, non-significant facilitation. In contrast, pupil dilation showed information conflict-larger pupil dilation to incongruent than to congruent and neutral conditions-and task conflict-larger pupil dilation to the congruent than to the neutral condition. Moreover, pupil indications for task conflict appeared earlier than indications for the information conflict. These results suggest that pupil changes could indicate conflict even in the absence of behavioral indications for the conflict.

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6:00-7:30 PM (1051)

Exploring Cross-Domain Control Adaptation in a Replication Study. BALAZS ACZEL, MARTON KOVACS, and MIKLOS BOGNAR, ELTE University, BENCE PALFI, University of Sussex - Exploring the mechanisms of cognitive control is central to understanding how we control our behavior. These mechanisms can be studied in conflict paradigms, which require the inhibition of irrelevant responses to perform the task. It is assumed that in these tasks the detection of conflict enhances cognitive control resulting in improved conflict resolution of subsequent trials. If the presence of conflict is sufficient for this conflict adaptation effect, then conflict adaptation can be expected to occur in cross-domain tasks. Previous research on the domain-generality of conflict adaptation presented inconsistent results. In this study, we provide a multi-site replication of three previous experiments of Kan et al. (2013) which test conflict adaptation between very different domains: from a syntactic to a non-syntactic domain (Experiment 1), and from a perceptual to a verbal domain (Experiment 2 and 3). Email: Balazs Aczel, balazs.aczel@gmail.com

6:00-7:30 PM (1052)

Must Reappearance the Whole Representation in Working Memory to Capture Attention. CHUN-YU KUO, National Taiwan Normal University, CHI-CHIN WANG and YEI-YU YEH, National Taiwan University - When an external stimulus refreshes an internal representation maintained in working memory, it captures attention. This working memory-based attentional capture has been demonstrated in various contexts using different stimuli. Yet, few studies have investigated the context for a part of a visual display maintained in working memory to capture attention. The present study addressed this issue using a dual-task paradigm. The participants remembered one or four spatial locations for later recognition, detecting the appearing dots, and recognized whether a probe display matched with the memorized locations. The locations of the to-be detected dots were identical to the remembered locations in the valid condition and mismatch the remembered locations in the invalid condition. The capturing effect was reflected by faster performance in the valid condition than in the invalid condition. The locations of the dot were irrelevant to both the recognition and detection tasks. The results showed the capturing effect only when the locations of to-be detected dot exactly matching the memorized locations. Reappearance of partial spatial representation in working memory by dot detection task was insufficient to induce the capturing effect. Email: Chun-Yu Kuo, chunyukuolab@gmail.com

6:00-7:30 PM (1053)

Evidence Against All-Or-None Short-Term Consolidation: Consolidation Speeds up with Prioritization and Is Interrupted by a Distractor Task. CLARA OVERKOTT and ALESSANDRA S. SOUZA, *University of Zurich* (Sponsored by Vanessa Loaiza) – Short-term consolidation is an attentiondemanding process that transforms sensory information into a stable representation in visual working memory. There is mixed evidence regarding whether consolidation is an all-ornone process. Evidence for it stems from a sequential itempresentation paradigm where the first item was consolidated irrespective of consolidation time. Evidence against it was obtained in tasks with simultaneous item-presentation in which consolidation was interrupted by a distractor task. Here, we investigated whether the all-or-none first-item consolidation effect in sequential arrays depended on (1) peripheral item presentation compared to central presentation; (2) prioritization of the first item; (3) lack of a distractor task to pull attention away from first item; and (4) sequential (vs. simultaneous) array presentation. Presentation mode (1 & 4) did not explain the mixed findings. Manipulation of prioritization via points speeded up consolidation and presenting a distractor task eliminated the all-or-none first-item effect. Together, these results suggest that consolidation is a graded process that can be modulated and interrupted depending on the availability of attention.

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6:00-7:30 PM (1054)

Distractor Suppression in Visual Working Memory. NICOLE HAKIM, University of Chicago, TOBIAS FELDMANN-WUSTEFELD, University of Southampton, LIAM CHAI and EDWARD K. VOGEL, University of Chicago (Sponsored by Edward Vogel) - Irrelevant information needs to be blocked from entering Working Memory (WM) because WM capacity is limited. This can be achieved by suppression of irrelevant information (distractors). We utilized the distractor Positivity (PD), a lateralized event-related potential, to investigate distractor suppression during WM encoding and maintenance. In a change detection task, we presented distractors during encoding and at two timepoints during maintenance. We found an equally large PD at each distractor onset, suggesting that irrelevant information is suppressed even after memory items are stable. In a second experiment, we found that the PD scaled with the number of distractors, but only at early timepoints. This suggests that once WM representations are stable, suppression is equally effortful regardless of the amount of distraction. In a third experiment, we found that the PD was larger for unexpected distractors, suggesting a top-down influence: the less we expect distractors, the more suppression is required. Email: Nicole Hakim, nhakim@uchicago.edu

6:00-7:30 PM (1055)

Inhibition of Return (Ior) in Working Memory? NAOMI LANGEROCK and EVIE VERGAUWE, *University of Geneva* – The present experiment investigates inhibition of return (IOR) in a working memory context. IOR has been largely documented in perceptual attention and refers to slower detection of a visual stimulus at a position that had just been cued. Recently, Johnson et al. (2013) have described IOR-like effects in reflective attention as well. Whereas perceptual attention refers to external attention to perceptual stimuli, reflective attention refers to internal attention to mental representations. Similarly to IOR in perceptual attention, Johnson et al. (2013) found slower reaction times to memory probes that had just been cued to be "refreshed". Refreshing refers to the reactivation of information that is no longer perceptually present, by bringing it back into the focus of attention. The focus of attention is typically conceived as a heightened state of accessibility, which seems at odds with IOR after refreshing. Therefore, we reexamined IOR after refreshing in WM.

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6:00-7:30 PM (1056)

Do Lapses of Attention Impact Binding Processes in Visual Working Memory? DWIGHT J. PETERSON and JACOB HANSON, Concordia College - Item-item binding performance in visual working memory (VWM) is reduced, relative to performance for single items, under experimenter imposed divided attention (Peterson, Decker, & Naveh-Benjamin, 2019). Likewise, internal lapses of attention disrupt VWM performance for single items compared to when participants are on-task (Unsworth & Robison, 2016). The current study examined the impact of internal lapses of attention during a change detection task which presented object pairs at encoding and measured performance during single-item and item-item binding test probes. Thought probes, appearing after the test probe on a subset of trials, were used to categorize participants' internal state of attention. Overall, performance decreased significantly; 1) during binding tests relative to single-item tests and 2) under internal lapses of attention relative to when participants were on-task. Contrary to our primary prediction, no lapse-of-attention related binding deficit was observed, suggesting that internal lapses of attention disrupt VWM processes in a domain-general manner.

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6:00-7:30 PM (1057)

Individual Differences in Single-Task Working Memory **Performance Predict Proactive and Retroactive Interference** in Dual-Task Working Memory Consolidation. BENJAMIN J. TAMBER-ROSENAU and BRANDON J. CARLOS, University of Houston - Estimates of working memory (WM) consolidation speed vary widely across experimental paradigms. Retroactive interference (RI) from a second task (T2) can reveal slow (~1 s) consolidation continuing after a visual mask (Nieuwenstein & Wyble, JEP:G, 2014). Such RI is robust to WM response demands but requires a speeded T2 response (Carlos & Tamber-Rosenau, VSS, 2019). Here, we relate individual differences in WM performance to both RI and proactive interference (PI) in 64 participants drawn from four dual-task experiments. Singletask WM accuracy correlated with changes in dual-task WM accuracy across stimulus onset asynchronies (SOAs) such that better single-task WM accuracy predicted reduced RI (r=.32, p<.01). Single-task WM accuracy also correlated with changes in dual-task T2 response times across SOAs such that higher WM accuracy predicted greater PI (r=.33, p<.01). Together, these results complicate estimation of consolidation speed in dual-task paradigms by demonstrating individual differences that may reflect varied task strategies.

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6:00-7:30 PM (1058)

Locus of Differential Divided Attention Effects on Component and Associative Information in Working Memory: Encoding vs. Maintenance. REED DECKER and MOSHE NAVEH-BENJAMIN, University of Missouri - In contrast to episodic long-term memory, divided attention in verbal and visual working memory (WM) leads to a disproportionate reduction in memory for the associations between components, compared to memory for the components themselves (e.g., Peterson, Decker, and Naveh-Benjamin, 2019a;b, JEP:LM&C). The current two studies further investigate whether the differential effects of divided attention in WM on components and associations are due to disruption during encoding or during maintenance. This was done by manipulating the difficulty of a concurrent tone discrimination task during either encoding and maintenance, or during encoding only. For visually presented word pairs, we found a three-way interaction indicating that increased concurrent task difficulty led to a larger memory decline for associations, compared to components, but only when divided attention was presented during both encoding and maintenance. For face-scene pairs, divided attention had the same disproportionate effect on associative memory regardless of the phase of processing.

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6:00-7:30 PM (1059)

Evaluating the Discrete-Slot Model of Visual Short-Term Memory. MARIA M. ROBINSON and DAVID E. IRWIN, University of Illinois at Urbana-Champaign, AARON S. BENJAMIN, University of Illinois at Urbana-Champaign (Sponsored by David Irwin) - Visual short-term memory (VSTM) is a limited capacity system. We evaluated the degree to which discrete-slot, continuous-resource, and hybrid models can account for performance in two standard VSTM tasks: a change detection task in which participants had to remember simple objects and a rapid serial visual presentation task in which participants had to remember real-world objects. Cross-validation indicated that continuous-resource models provide a superior understanding of both tasks. To gain a fuller understanding of limits in VSTM, we evaluated the ability of the theories to jointly model the two tasks. As part of this analysis, we tested a variant of a hybrid model that includes a fixed item capacity but differentially engages an attention-like resource that determines the resolution of memory representations. Cross-validation analysis again supported continuous-resource models and indicated that performance across these tasks cannot be captured by any model of capacity or resource with parameters fixed across tasks.

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6:00-7:30 PM (1060)

Multitasking's Effects on Comprehension: Do Individual Differences in Working Memory Matter? KATELYN A. LEE and STEPHANIE A. KAZANAS, *Tennessee Technological University* – Multitasking is progressively becoming more common in Western cultures. Researchers concerned with the possible effects of multitasking have found negative correlations with academic performance and working memory. Based on these findings, the current study investigated the effects of multitasking on comprehension, when accounting for individual differences in working memory ability. Participants were randomly assigned to either a multitasking condition, nonmultitasking condition, or control condition. Each participant completed the Reading Span Task and a portion of the Nelson Denny Reading Test. Participants in the multitasking condition also completed simple multiplication and division problems throughout the Nelson Denny Reading Test. Participants also self-reported their general multitasking habits and behaviors while they completed the study. This study contributes to ongoing efforts examining the critical, but often undervalued role of individual differences on cognitive performance. Our results highlight the need for additional work in this complex domain.

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6:00-7:30 PM (1061)

Diagnosing Short-Term Memory Scanning Using Systems Factorial Technology: A Replication Study. KEGAN OLSEN, MONICA VAN TIL, LOLA ERFOURTH, and MARIO FIFIC, Grand Valley State University - Townsend and Fific (2004) published an influential short-term memory (STM) study in which they observed individual differences in serial and parallel STM scanning. The authors employed systems factorial technology -a novel methodology which provides strong diagnostic tests of cognitive architectures-and presented a new method of manipulating probe-to-memory item processing speed for memory loads (N=2). Three variables were manipulated in this experiment: number of processing elements (N=2), phonemic dissimilarity of a target to the particular memorized item (high, low), and duration between the memorized set and a target (short, long). In the original study, 10 subjects participated in about 20 sessions each. In the present study, we conducted a conceptual replication of the original study. Two-hundred subjects participated in 1 session each, and a novel memory load condition (N=1) was included. Results contributed converging evidence in testing serial/ parallel processing in short-term memory scanning. Email: Mario Fific, fificm@gvsu.edu

6:00-7:30 PM (1062)

Individual Differences Modulate How Gesture Facilitates Working Memory During Visual-Spatial Tasks. STEPHANI M. FORAKER and DANIELLE BELLMAN, *Buffalo State College, SUNY* – Gesturing during communication can help or hinder cognitive processing. We examined how individual differences in working memory resources modulate gesture's cognitive benefit for a picture description task with explicit visual-spatial locations and relations. Participants saw a fourdot pattern in a grid (visual-spatial) or six letters (verbal), then described a picture while either gesturing or not, and then recalled the dots or letters. Using multi-level regression, we found that gesturing increased memory accuracy, rather than causing interference, during both visual-spatial and verbal WM load, consistent with previous research. However, complex interactions for the visual-spatial load group indicated that gesture's benefit is not straightforward. For lower WM individuals, gesturing can improve working memory accuracy, but only when gesture production occurs relatively easily, and speech communicates information efficiently. When gesturing is added (second block), only higher WM individuals benefited from gesturing, and only when speech rate was higher. In sum, gesturing can lend a helping hand to multi-tasking situations, but its benefit is modulated by task difficulty, the producer's WM resources, and speech efficiency.

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6:00-7:30 PM (1063)

Listening Span Test Development for Japanese Efl Elementary School Students. YASUYUKI SAKUMA and SHUICHI TAKAKI, Fukushima University - The phonological loop of working memory (WM) plays an important role in language processing. Two main types of span test, the digit span test, in which items are repeated in sequence to measure verbal shortterm memory, and the listening span test (LST), in which the processing and retention involved in not only comprehending each sentence but also memorizing each final word in each sentence are used to measure WM capacity, have been employed to elucidate cognitive features of phonological language information in the phonological loop. LSTs offer an important index of the cognitive complexity of listening comprehension. Although LSTs have been developed in Japanese (L1) for Japanese elementary school (ES) students, there is no LST for English as a foreign language (EFL). This study investigated the validity of EFL LSTs for Japanese ES students by examining relationships among Japanese-language L1 LST, EFL LST, and EFL listening comprehension abilities.

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6:00-7:30 PM (1064)

Visual Working Memory for Objects in Naturalistic Scenes in Young Adults with and Without Adhd. NETA CHAI EZRA, Hebrew University of Jerusalem, HAGIT MAGEN, Hebrew University of Jerusalem (Sponsored by Hagit Magen) - Adults with ADHD often show limitations in visual working memory (VWM) tasks. In this study, we examined whether these limitations manifest in VWM for objects in naturalistic scenes, and whether individuals with ADHD would encode and maintain a representation of the scene as well, given observed capacity limitations. Sixty-four university students with and without ADHD were compared on a VWM task in which they memorized real-world objects embedded in naturalistic scenes. During test, the probed objects appeared with or without the original scene in the background. The results showed that participants in the ADHD group performed significantly worse that controls across all conditions. Removing the background during retrieval disrupted memory to the same extent in both groups. The results of the study provide additional evidence for limitations in VWM in adults with ADHD that extend to naturalistic scenes. Nevertheless, despite limitations in memory for the objects themselves, individuals with ADHD encoded and maintained an intact representation of the entire scene. Email: Neta Chai Ezra, netahae@gmail.com

6:00-7:30 PM (1065)

Working Memory Complex Span Tasks and Fluid Intelligence: Does the Structure of the Task Matter? MIRIAM DEBRAISE, Université Côte d'Azur, NICOLAS GAUVRIT, Université d'Artois, FABIEN MATHY, Université Côte d'Azur (Sponsored by Fabien Mathy) - The complex span tasks used to evaluate working memory (WM) capacity are predictive of many aspects of higher-order cognition. However, the structure of these tasks varies from one study to another and it has not been questioned yet whether these variations could influence their predictive power. Indeed, previous studies have typically used either processing-and-storage tasks (e.g., the Operation Span task of Unsworth et al. 2005), or alternatively storage-and-processing tasks (e.g., the Operation Span task used by Barrouillet & Camos, 2001). We present one experiment in which the order between processing and storage was manipulated in young adults. The participants were submitted to two conditions: processingand-storage vs storage-and-processing. After completing both complex span tasks, the participants performed a reasoning test (Matrices of the WAIS). Results showed a significant difference in WM spans between the two conditions, with higher spans observed in the processing-and-storage task compared to the inversed structure of the task. The correlations showed that both tasks were equally predictive of performance in complex cognitive ability. These results are discussed in regards of the Time-Based Resource-Sharing model.

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6:00-7:30 PM (1066)

Who's to Blame: Working Memory, Cognitive Load, and Victim Race. ALESHA D. BOND, (J. Frank Yates Student Travel Award Recipient), KEVIN M. SWARTOUT, and DAVID A. WASBURN, Georgia State University (Sponsored by David Washburn) - One in five women have been a victim of sexual assault or rape. Sexual violence against women of color remains drastically understudied. Black women are often associated with negative or problematic stereotypes (i.e., Jezebel) that often associates black women with assumed aggressiveness and hypersexuality. Cognitively, stereotypes are a type of heuristic or mental short cut, that people reply on when making judgments and decisions. Previous research in mundane mock scenarios (e.g., light falling on a patron at a stadium) has shown that individual differences in working memory accompanied with cognitive load may impact the degree to which participants find victims to be culpable. In this study, participants were shown a mock police report of a sexual assault and asked culpability questions about the victim (Black or White) and the perpetrator. We investigate the degree to which people (varying in working memory capacity) may rely on racial stereotypeconsistent mental short cuts when cognitively taxed (i.e., load). Preliminary results suggest that people with cognitive load victim blame more than people without cognitive load and hold perpetrators more responsible when the victim is White compared to Black.

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6:00-7:30 PM (1067)

Tracking the Value of a Location-Varying Feature Depends on Working Memory Resources. ANNA C. MCCARTER and TIMOTHY J. VICKERY, University of Delaware (Sponsored by Timothy Vickery) - Real-world value-tracking tasks often require humans to track the values of some features while ignoring variation in other features. We posited that learning to attach value to a feature when that feature is randomly paired with other features might be working-memory (WM) dependent. We instructed subjects to learn either the assigned value of 4 locations or 4 colors, with color and location randomly paired on each trial. They also performed a secondary task, stressing either location WM (remember positions of two sequentially presented dots), color WM (remember the color of 4 squares), or neither. We indexed value-tracking performance in the second half of each block. While WM load of both types impaired color-value tracking, neither type of WM load affected location-value tracking. This implies that location-value tracking (confounded with motor action) does not depend on WM resources, but color-value tracking depends on general WM resources.

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6:00-7:30 PM (1068)

A Method for Relating the Subjective Difficulties of Different Kinds of Tasks to Task-Order Preferences: Speaking One Language or Another and Adding Numbers or Lifting Objects. DAVID A. ROSENBAUM, EVE E. HIGBY, and IMAN FEGHHI, University of California, Riverside, TAOMEI T. GUO, Beijing Normal University, GUADALUPE G. MENDOZA and SAMANTHA S. RAMOS, University of California, Riverside (Presented by David Rosenbaum) (Sponsored by David Rosenbaum) - People sequence tasks all the time, often by considering the relative difficulty of the tasks. Because the tasks are often of different kinds, it is not obvious how their relative difficulties are compared. We estimated the subjective difficulty of different kinds of tasks and determined how subjective difficulty relates to preferred task ordering. Our participants indicated which they thought was easier, doing task A nA times or doing task B nB times. The same participants also made comparable task-order judgments. The ratio nA/(nA+nB) corresponding to p(A)=.5 was the point of subjective equality (PSE) for the tasks. PSE's changed with proficiency ratings and task completion times. Task-order PSE's and task-ease PSE's were positively correlated, but the relation was quadratic rather than linear. The probability of preferring to do the easier task first grew at a higher rate than the probability of judging one task easier than the other.

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6:00-7:30 PM (1069)

Processing Stage Specificity of Cognitive Pupil Dilation Effects. SAMANTHA JOUBRAN, University of Guelph & McMaster University, SCOTT WATTER, McMaster University, NASEEM AL-AIDROOS, University of Guelph (Presented by Samantha Joubran) (Sponsored by Naseem Al-Aidroos) – Many studies in experimental psychology have established task-related pupil dilation as a general measure of cognitive workload or effort. Past literature supports the notion that pupil dilation positively correlates to task difficulty. The current study aimed to investigate relative contributions of central semantic processes from response-related contributions to cognitive event-related pupil dilation effects. Twenty-eight McMaster University students gave immediate or delayed responses to two tasks: a simple (big/small) categorization of concrete nouns or more evaluative pleasantness ratings (1-4 scale) of items from the same set. The expected task dilation difference (pleasantness>size) was equivalent with or without immediate responding and having to respond immediately added a substantial additional and independent dilation effect. The task of making an overt response in itself imposes substantial load. Overt responding and semantic judgement aspects of tasks appear to have additive effects on pupillary response. Email: Naseem Al-Aidroos, naseem@uoguelph.ca

6:00-7:30 PM (1070)

The Cost of Task Order Choices. AMANDA DEVORE, DAWN M. MCBRIDE, and RACHEL L. VONDERHAAR, Illinois State University - An area of cognitive research receiving attention in recent years is that of task order choices. Recent studies have shown that people often choose to do a task as soon as possible to reduce cognitive load (Fourier et al., in press; Rosenbaum et al., 2014), known as precrastination. The present study examined the cost to other tasks resulting from task order choice. Participants were asked to complete two blocks of a lexical decision task. They were also asked to generate category exemplars at a specific time surrounding the trial blocks or at a time of their choosing. The results showed that individuals who chose to complete the generation task later in the block sequence performed the lexical decision task more slowly than those who were told when to complete the task; whereas individuals who chose to complete the task first performed just as quickly as the assigned groups. These results suggest that choosing to delay an intended task results in added task interference due to the choice itself.

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6:00-7:30 PM (1071)

When Do We Choose to Perform Cognitive Tasks? ROSAURY HERNANDEZ and DAWN M. MCBRIDE, Illinois State University (Sponsored by Alycia Hund) - Precrastination is observed when individuals start a task earlier than required in order to reduce cognitive load even if it requires more physical effort (Rosenbaum et al., 2014). A recent study generalized this effect to a cognitive task (VonderHaar et al., 2019). The purpose of the present study was to further investigate precrastination tendencies in cognitive tasks. Participants were asked to complete a perceptual-motor box-moving task and also to generate six-item lists of exemplars from different categories at a time of their choice during each box-moving trial. The difficulty of the category was manipulated to examine the effect on precrastination. Although past studies found less precrastination for more difficult tasks, the present study did not replicate this effect. In addition, across all trials, the

generation task was performed before and after the box moving task equally. These results suggest that precrastination may be limited to specific kinds of tasks.

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6:00-7:30 PM (1072)

Impact of Real-Word Scenarios on the Bottleneck Effect. TESSA MCCOY and SUSAN E. RUPPEL, University of South Carolina Upstate, SCOTT MEEK, University of South Carolina Upstate - The bottleneck effect occurs when individuals try to perform two tasks simultaneously, and one suffers at the expense of the other. The majority of the research examining the bottleneck effect has utilized laboratory procedures, which limit the findings to an artificial setting. The goal of the current experiment was to assess if similar results could be found with a more real-world, voluntary decision-making task. Participants first heard a directionally distinct car horn, then were faced with a go/no-go decision task in the form of a driving simulation. Participants were to indicate the horn's direction while simultaneously deciding whether to go or stop at an intersection. The stimulus-onset asynchrony (SOA) between the horn stimulus and the driving decision was varied between trials. Response times were measured for both the horn and go/no go tasks. Results indicated a bottle neck effect with the driving simulation task.

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6:00-7:30 PM (1073)

Elucidating the Differential Impact of Extreme Information in Perceptual and Preferential Choice. YONATAN VANUNU (Graduate Travel Award Recipient), University of New South Wales, JARED HOTALING, University of New South Wales, BENJAMIN R. NEWELL, University of New South Wales (Sponsored by Benjamin R. Newell) - When making decisions in complex environments we must selectively sample and process information with respect to task demands. Previous studies have shown that this requirement can manifest in the influence that extreme outcomes (i.e., values at the edges of a distribution) have on judgment and choice. We elucidate this influence via a task in which participants are presented, briefly, with an array of numbers and have to make one of two judgments. In 'preferential' judgments where the participants' goal was to choose between a safe, known outcome, and an unknown outcome drawn from the array, extreme-outcomes had a greater influence on choice than mid-range outcomes, especially under shorter time-limits. In 'perceptual' judgments where the participants' goal was to estimate the arrays' average, the influence of the extremes was less pronounced. A novel cognitive process model captures these patterns via a twostep selective-sampling and integration mechanism. Together our results shed light on how task goals modulate sampling from complex environments, show how sampling determines choice, and highlight the conflicting conclusions that arise from applying statistical and cognitive models to data. Email: Yonatan Vanunu, yyv1984@gmail.com

6:00-7:30 PM (1074)

Children Infer Implicit Recommendations from Default Options. LIM LEONG and ADENA SCHACHNER, University of California, San Diego - Decision makers tend to stick with pre-selected options, even when switching is easy. This default effect occurs in part because of a social inference - defaults are seen as implicit recommendations (McKenzie et al., 2006). We asked if preschool age children also make this social inference: Because defaults do not affect the option set or substantially change the cost of choosing either option, it may be challenging for children to infer others' preferences about what they should choose from this cue alone. We presented 4- to 6-year-old children (N = 60) with two options (of videos to watch), and manipulated which option was the default. Crucially, when asked which video the researcher wanted them to watch, children systematically inferred the default option (68%; binomial test, p = .013). They also showed a default effect in their choice of video (67%; binomial test, p = .009), even though most said that switching from the default option would be easy (64%; binomial test, p = .044). Thus, young children, like adults, can infer the goals and desires of other social agents from default options. This finding sheds light on children's social reasoning, and on the causal mechanisms underlying default effects in early life. Email: Lim Leong, lmleong@ucsd.edu

6:00-7:30 PM (1075)

Differentiating Social Preference in Hypothetical Resource Allocation. BLAKE S. CAVVE, MARK HURLSTONE, and SIMON FARRELL, University of Western Australia (Sponsored by Simon Farrell) - Despite consistent evidence that social context matters to decision-making (e.g., Easterlin, 1995; Frank, 1999), potential forms of social context concern are rarely, if ever, pitted against one another in any principled or direct manner. The current study sought to differentiate two key forms of social preference; a concern with fairness or equality (Inequality Aversion; Fehr & Schmidt, 1999) and a concern with status competition (Brown, Gardner, Oswald & Qian, 2008). Adapting the "burning" paradigm (Zizzo & Oswald, 2001) participants allocate or eliminate sums of currency from peers in a series of hypothetical resource distributions. Bayesian model selection, used to establish which proportion of individuals are best fit by fairness and status concerns respectively, indicates substantial individual differences in hypothetical allocations. Understanding the prominence and form of social preference is important to understanding the perplexing co-occurrence of destructive competition and altruistic human behaviours, as well as potential support for redistributive policy (e.g., taxation regimes; Duffy & Kornienko, 2010; Hopkins & Kornienko, 2004, 2009).

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6:00-7:30 PM (1076)

Expertise and Sex Identification in Dogs. RICHARD TOPOLSKI, KAREN REX PIUS VINCENT, NICOLE MOREL, TYRELL JACOBS, and CHANDANI PATEL, *Augusta University* – Expertise is commonly recognized as having a significant impact on performance. Recognizing this, past research has shown that expertise improves performance

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on various domains ranging from facial recognition to chicken sexing. However, less understood is how expertise reduces cognitive biases when making decisions. The current study examines the effects of expertise in a novel domain- determining the sex of canines. This study hypothesizes that experts (i.e. dog show judges and dog breeders) are able to identify the sex of short-haired breeds of dogs more effectively than non-experts. Furthermore, we predict experts to have greater resistance to cognitive biases than non-experts. Specifically, non-experts will more often label aggressive and large dog breeds as male and small non-aggressive breeds as female. A pilot study confirmed the existence of strong sex stereotypes for dog breeds, p < .05. Participants categorized images of dogs as being owned by either one of two masculine or feminine archetypes, Cinderella or GI Joe, based on shared personality traits. The five most stereotypical masculine and feminine dogs were used in the main study. Data collection is ongoing. The results will be used to further machine learning.

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6:00-7:30 PM (1077)

Fairness in Initial Salary Offers: The Effects of the Applicant's Gender and Gender Stereotypes. RENATA MELINDA HEILMAN and SABINA RAMONA TRIF, Babes-Bolyai University - Our study aims at investigating fairness aspects in initial salary offers in a set of hypothetical hiring decisions. 221 undergraduate healthy students voluntarily participated in this study. Participants were present with 12 hypothetical hiring scenarios in which they were requested to select one of two potential applicants for a certain job. We manipulated the gender of the applicants and the gender specific jobs. In addition to the applicant selection decisions, participants had to make an initial salary offer for the selected applicant. Our results indicate that participants prefer to select the applicant whose gender corresponds with the gender stereotype associated with the job. Moreover, initial salary offers were also influenced by the compatibility between the applicant's gender and the jobrelated gender stereotype, with men being offered more for men-specific jobs, and women being offered more for womenspecific jobs. In conclusion, this study provides behavioral results that are in line with previous studies showing differences in wage offerings for women and men as well as the existence of gender stereotypes with regard to jobs for which men and women would be perceived as being more qualified. Email: Renata M. Heilman, renataheilman@psychology.ro

6:00-7:30 PM (1078)

Public Perception of Mental Illness as a Risk Factor in a Criminal Case. LAUREN MCDOWELL and JUDITH PLATANIA, *Roger Williams University* (Sponsored by Garrett Berman) – Misconceptions surrounding mental illness and the cognitive biases suggested by Pennington and Hastie's Story Model challenge lay persons' involvement in jury decision making. The current study examines circumstances under which individuals perceive mental illness as a risk factor in a criminal case. A sample of 173 participants participated in a 2 x 2 x 2 between-subjects factorial design, varying defendant's mental illness, criminal history, and social support. Participants rated defendants' dangerousness and likelihood to reoffend, identifying contributing factors. Multivariate analysis indicated that participants perceived mentally ill and previously convicted defendants to be more dangerous. They also considered mentally ill, previously convicted, and socially unsupported defendants to be more likely to reoffend. Overall, participants' scores on the Attitudes to Mental Illness scale identified 'fear' of the mentally ill as a significant predictor of participants' perceptions. However, among participants whose defendants were mentally ill, 'fear', 'integration', and 'tolerance' were all significant predictors.

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6:00-7:30 PM (1079)

The Role of Confidence and Egocentric Bias in Bargaining Under Uncertainty. VINCENT DE GARDELLE, CNRS & Paris School of Economics, QUENTIN CAVALAN, Paris School of Economics, JEAN-CHRISTOPHE VERGNAUD, CNRS (Presented by Vincent de Gardelle) - How individuals evaluate their own abilities may shape their interactions with others. Here, we evaluate the role of confidence biases in a bargaining game between two individuals. In a laboratorybased experiment, pairs of participants made a series of perceptual decisions, and then have to share the joint outcome announced to them, without any information about their individual contributions. We found that participants almost always ask for half or more of the joint outcome, leading them to disagree during bargaining, which leads to costly settlements in court. By collecting confidence ratings before and after they receive information about the joint outcome, we could evaluate separately participants' tendencies to over-estimate their performance (overconfidence bias) and to under-estimate the contribution of others (egocentric bias). We show that participants exhibit both biases. We then tested interventions by which we informed participants about their own biases during the experiment. We found that such interventions could reduce the egocentric bias, leading to a decrease of bargaining failures. Overconfidence bias, by contrast, was not affected by our interventions.

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6:00-7:30 PM (1080)

The Association Between Vaccination Decisions, Cam Use and Perceived Vulnerability to Disease. LINDA C. KARLSSON, Åbo Akademi University, STEPHAN LEWANDOWSKY, University of Bristol, JAN ANTFOLK, Åbo Akademi University, HASSE KARLSSON and LINNEA KARLSSON, University of Turku, MIKAEL LINDFELT, Åbo Akademi University, ANNA SOVERI, University of Turku (Sponsored by Stephan Lewandowsky) - Investigating reasons behind parents' decision to leave their children unvaccinated, despite the well-established benefits of vaccines, is important in maintaining high vaccine uptake. This study, conducted on 771 Finnish parents, focuses on whether the vaccination decision (concerning childhood and influenza vaccines) is related to the use of complementary and alternative medicine (CAM) and perceived vulnerability to disease. The results showed that more CAM use was associated with skepticism towards childhood vaccines but not influenza

vaccines. However, not taking the influenza vaccine was related to higher perceived risk for infections. This supports the idea that the reasons behind vaccination decisions are vaccine-specific. The association between CAM and childhood vaccinations may be related to an underlying health-related view, while perceived infectability seems to play a greater role in the decision to take the influenza vaccine. These differences between vaccines are important to take into account when communicating with patients about vaccines.

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6:00-7:30 PM (1081)

Modelling Preference Reversals in Context Effects over Time. ANDREA M. CATALDO and ANDREW L. COHEN, University of Massachusetts, Amherst (Sponsored by Andrew Cohen) - Context effects, such as the attraction, compromise, and similarity effects, constitute benchmark behavioral phenomena for theories of preferential choice. Previous research using signalto-respond paradigms suggests that these phenomena develop differentially over time. Although numerous models of context effects make response time predictions, these predictions have only recently been tested. Across seven different free-response data sets we find a consistent crossover pattern such that the attraction and compromise effects are associated with slower response times and the similarity effect is associated with faster response times. Using recently developed sampling techniques (Evans et al, 2019; Turner & Sederberg, 2014), we jointly fit four information accumulation models (MDFT, LCA, AAM, MLBA) to previously published choice and response time data (Cataldo & Cohen, 2018). The MLBA best fit the means, and MDFT and the AAM partially captured the crossover effects. None of the models captured the full spectrum of results. The present work provides new insights into the relationship between choice and response times and sets important constraints for models that seek to account for such behavior.

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6:00-7:30 PM (1082)

Is it My Fault if My Boss Told Me to Do So? How the Lack of Agency Elevates Moral Responsibility for a Negative Consequence. SONIA SEUNG-EUN KIM, MAAYAN MALTER, and JANET METCALFE, Columbia University (Sponsored by Janet Metcalfe) - According to previous research on moral dilemmas, including the traditional Trolley Car Problem, agency increases the feeling of moral responsibility. Surprisingly, our study showed that this effect can be reversed: when the person's agency was thwarted by having them obey the orders of their boss, our results showed that they felt more responsible for negative consequences than when they made the decision themselves. In two experiments, we asked individuals to imagine themselves as programmers for self-driving cars. Either they decided themselves (high agency condition) how to program the car, including deciding how it would behave in an accident situation in which either the driver or multiple other people would be killed, or they were told by their boss how to program it (low agency condition). They then read a scenario in which the car caused a tragic outcome in a fatal traffic accident because of their programming. Both experiments showed that individuals felt more responsible for the outcome, and more regret, in the *low* agency condition. In addition, the level of responsibility decreased as time lag from the programming to the accident increased. Reasons for this reversal of the usual finding will be discussed.

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6:00-7:30 PM (1083)

The Influence of Complexity on Perceptual and Preferential Judgements. YVONNE OBERHOLZER, University of Geneva, SEBASTIAN OLSCHEWSKI, University of Basel, BENJAMIN SCHEIBEHENNE, University of Geneva - Risk aversion has been studied with problems of varying complexity. However, complexity as a factor has been largely ignored by most researchers and is usually not included in cognitive models. We address this gap by studying the previously reported effect of complexity aversion with a dual approach involving perceptual and preferential decision problems. We investigate three possible causes of the effect: (i) direct influence of complexity on valuation (ii) indirect influence via unsystematic noise and (iii) indirect influence via systematic errors. We use a 2-factorial within-subjects design, manipulating complexity and type of task (perceptual or preferential) and controlling for expected value, variance, range and skewness. For data analysis, we employ a multilevel model analysis. Our results support the second explanation, showing that complexity has a moderate effect on valuation accuracy. Concerning the first explanation, we additionally find support for the null hypothesis, revealing that there is no direct influence of complexity on valuation. Taken together, this suggests that previous findings of the effect are most likely due to asymmetric experiment designs, which were affected by an increase of unsystematic noise. Email: Yvonne Oberholzer, Yvonne.Oberholzer@unige.ch

6:00-7:30 PM (1084)

Developmental and Cross-Cultural Perspectives on Risk-Taking and Economic Decision Making. ERIN ROBBINS, University of St Andrews - Empirical and ethnographic accounts remain unclear about how culture influences risktaking. Prospect theory suggests that individuals should be risk averse, predisposed to factor the potential value of losses/ gains (rather than the ultimate outcome) into their choices. We investigated this in an on-going suite of studies comparing risk-taking in children (5-10 years old; N = 120) and adults (N = 120) of contrasted cultures (USA, UK, Mexico, Samoa, Vanuatu, & Taiwan). Participants received an endowment, then in 4 counterbalanced conditions chose between a sure bet and a gamble that varied in riskiness (low: 50% chance of doubled win/loss; high: 25% chance of a quadrupled win/loss). Results demonstrate the proportion of gambles depends on condition for children and adults in individualistic but not collectivistic cultures. A second game probed probabilistic reasoning (avoiding an item hidden under 1 of 10 cups) when guessing was one-shot or sequential; no cultural differences were noted. In all, evidence suggests culture influences risky decisions, but

not probability understanding. We relate findings to recent work on loss attention (Yechia & Hochman, 2013) and discuss potential cultural differences in endowment effects. Email: Erin Robbins, er70@st-andrews.ac.uk

6:00-7:30 PM (1085)

Indecisiveness Is Associated with Reduced Coherence Shifting in Decision Making. ANDREA L. PATALANO, JOHN NEIL, and KATHERINE WILLIAMS, Wesleyan University (Presented by Andrea Patalano) - Decision makers exhibit coherence shifting, which is a shift in reported preferences over time in the direction of providing stronger support for emerging decisions. In the present preregistered study, we sought to replicate the coherence shifting effect and to assess whether general indecisiveness is associated with reduced coherence shifting. An internet sample of adult participants (N = 88) reported their pre-choice evaluations of job attributes (e.g., salary, commute time), made a choice between two specific hypothetical job opportunities, and then reported post-choice evaluations. They also completed a scale measure of trait indecisiveness. As predicted, we replicated the coherence shifting effect and found that indecisiveness was moderately negatively correlated with coherence shifting as well as with decisional confidence. We speculate that having more fixed preferences in the short term may contribute to indecisiveness.

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6:00-7:30 PM (1086)

Epiphany or Apophany? Tracking the Evolution of Belief Updating. ROSALIND NGUYEN and MICHAEL DOUGHERTY, University of Maryland, College Park (Sponsored by Michael Dougherty) - Our search for meaning about the events we see around us requires us to engage in hypothesis generation and testing. As we grow in experience, sample more from our environment, and build our knowledge, we integrate this information in order to update our beliefs. While this process should allow one to consider alternate hypotheses, research has suggested that we may become rigid or even polarized in our views. This is attributed to how we are biased in the tendency to seek out and favor some information over others and interpret in a manner that is supportive of our existing beliefs. In this project, we take the stance that one's initial belief state predominantly shapes our subsequent beliefs. That is, our prior experiences influence our future experiences. Using a model of hypothesis generation, HyGene, we track the evolution of belief updating through information sampling, learning, and hypothesis guided search. We begin with a stochastic process that creates variations in prior experiences. By making minimal assumptions about the structure of the environment, we examine how these randomly generated starting points, reflecting our past experiences and prior beliefs, can lead to differences in where we end.

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6:00-7:30 PM (1087)

Et Two, Decius Brute? Anchoring Biases by Mere Presence of Numbers. KIMIHIKO YAMAGHSHI and TAKUTO NISHIMURA, *Tokyo Institute of Technology* – Circa Tversky and Kahneman (1974), anchoring and adjustment have served as an omnipresent explanation for numerical judgments. However, literature shows divergent explanations as to HOW anchor numbers affect subsequent responses. Mussweiler and Strack (1997) argued that a number must maintain semantic relevance to judgmental topic to affect the outcome. Wong and Kwong (2000), in contrast, claimed that the very presence of mere numbers would suffice to produce an effect. We contrasted these different accounts by comparing anchor information in nominal scales (e.g., Hillel Einhorn, Quentin Tarantino) or ratio scales (e.g., Trois-Ponts). Results favored Wong and Kwong's account in that merely presented numbers affected the judgment.

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6:00-7:30 PM (1088)

Typing Fluency as a Visible Indicator of Uncertainty in Written Production. ARIELLE V. ELLIOTT and WILLIAM S. HORTON, Northwestern University - In collaborative tasks, judgments about a partner's knowledge can be influenced not just by what they say (content), but how they say it (delivery). While face-to-face contexts provide access to cues like gestures or speech disfluencies, text-based interfaces permit only subtler delivery-based cues such as the relative timing of production. In shared workspaces like Google Docs, though, users have realtime access to others' actions, providing increased availability to potentially informative cues. In this study, we examined whether a user's level of uncertainty would be evident in their real-time typing patterns. We asked participants to compose brief descriptions of sets of unfamiliar images that were either difficult or easy to describe. Some of the images also repeated several times. When participants were unfamiliar with the content they were describing, they displayed less fluent typing patterns, which included more frequent pauses, more frequent backspaces, and slower typing speed. This confirms that message uncertainty can be reflected in the output visible onscreen. In a second study, we examine whether naïve viewers can use these cues to make accurate inferences about the typist's familiarity with the task.

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6:00-7:30 PM (1089)

The Scope of Phonological Encoding in Connected Speech. ORIANA KILBOURN-CERON and MATTHEW GOLDRICK, *Northwestern University* – Studies have found that speakers plan the articulatory details of their utterances about a word in advance before they begin speaking. How soon are the details of the following words planned? We examine how the availability of subsequent words affects planning using contextually constrained variation in speech sounds. The final sound in e.g. "great" varies in pronunciation depending on the sound that follows, being pronounced as a brief, voiced sound ("flap") only if a vowel follows, as in "greatest." In this study we examine speakers' use of the flap variant as a measure of advance planning. Participants produce adjective-noun phrases in which we manipulate availability of the second word via lexical frequency (e.g., "great artist" vs. "great epoch"). If speakers flap

less when upcoming words are infrequent, this suggests that degree to which speakers plan ahead in multi-word sequence depends on availability of the second word.

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6:00-7:30 PM (1090)

Form Overlap Effects in Spoken and Written Word Production. QINGQING QU and CHEN FENG, Chinese Academy of Sciences, MARKUS DAMIAN, Bristol University - We have investigated word form overlap effects in spoken and written production using the form preparation paradigm. Chinese speakers repeatedly reported the names of a small set of objects within a block, and form overlap between responses words within a block was manipulated. In Experiment 1, in the "position-consistent" condition object names shared an initial syllable within a word. In the "position-inconsistent" condition, the overlap of syllables distributed unpredictably within words. In Experiment 2, critical trials were interleaved with filler trials but inhibition still emerged, suggesting a persistent origin. Experiment 3&4 have been conducted with written production responses in which the orthographic unit was manipulated. we found a) facilitation from "position-consistent" form overlap; b) interference from "position-inconsistent" form overlap, and c) most importantly, interference with "position-inconsistent" overlap even with unrelated filler responses interleaved with the critical responses. In combination, these results lend support to the idea that incremental learning is a universal property of the language production system which can account for effects of semantic as well as phonological/orthographic overlap. Email: Qingqing Qu, quqq@psych.ac.cn

6:00-7:30 PM (1091)

The Gap Hypothesis: An Integrative View of Gender Acquisition and Processing. ANA RITA SÁ-LEITE, University of Santiago de Compostela, ÂNGELA TOMAZ, University of Minho, JUAN HERNÁNDEZ-CABRERA, University of La Laguna, ISABEL FRAGA, University of Santiago de Compostela, MONTSERRAT COMESAÑA, University of Minho (Sponsored by Fabrice Parmentier) - The way grammatical gender is processed during noun production in the picture-word interference paradigm (PWIP; participants have to name aloud a picture while ignoring a superimposed distractor noun) has led to mixed results. Whereas speakers of Germanic/Slavic languages show a Gender-Congruency effect (GC; faster responses to same-gender picture-distractors pairs than to different-gender pairs) when using Noun Phrases (NPs, "the house"), speakers of Romance languages show it with Bare Nouns (BNs, "house"). To explain these findings, we developed the Gender Acquisition and Processing (GAP) hypothesis under which grammatical gender is more of a lexical property for Romance languages and more of a syntactic one to Germanic/ Slavic ones. This is because Romance languages have nominal endings that function as phonological cues for gender values. In the present work, we tested the GAP hypothesis via two PWIP experiments with European Portuguese (EP) native speakers using BNs and NPs. As EP is a Romance language that shares some features with Germanic/Slavic languages, GC effects
were expected for both BNs and NPs. The results opposed the universality of some classical models of language production and confirmed the GAP hypothesis.

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6:00-7:30 PM (1092)

Structural Alignment to Nonnative Speech. RACHEL L. WILLIAMS and KARLY M. SCHLEICHER, University of Texas, El Paso, IVA M. IVANOVA, University of Texas, El Paso (Sponsored by Ana Schwartz) - We investigated how a nonnative accent may influence structural alignment in native speakers, to explore the roles of signal clarity, attentional focus and social distance for alignment. 163 English monolinguals from Amazon Mechanical Turk listened to recorded English dative prime utterances spoken by a native speaker of American English, a native speaker of Mexican Spanish, and a native speaker of Japanese, and then typed picture descriptions. There was an overall alignment effect but no differences in alignment to the different speakers. These results contrast with the finding of Weatherholtz et al. (2014) that alignment decreased with perceived dissimilarity with a speakers' accent. A second experiment will investigate if structural alignment to a nonnative-accented speaker would be disproportionally affected by attentional load (mouse-tracking of a moving dot while listening to prime utterances). This would suggest that the (more effortful) processing of nonnative phonology reduces attention to those utterance aspects that give rise to structural priming. Another experiment will explore the role of participants' beliefs about the speakers for structural alignment to nonnative-accented speakers.

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6:00-7:30 PM (1093)

Plan Reuse in Motor and Language Production. AMY L. LEBKUECHER, Pennsylvania State University, NATALIE SCHWOB, Pennsylvania State University, MISTY KABASA and MARYELLEN C. MACDONALD, University of Wisconsin-Madison, DANIEL J. WEISS, Pennsylvania State University (Sponsored by Daniel Weiss) - The production of a complex sequence of actions requires the use of a hierarchical, abstract plan held in temporary memory. To lessen the cognitive load imposed on temporary memory by planning, individuals tend to reuse recently activated abstract plans and adapt them as needed rather than generate novel plans for each production instance. While this tendency for reuse (i.e., Plan Reuse) has been found in both motor and language production, research on planning in these domains has largely been conducted independently. The current study evaluates parallels in Plan Reuse across domains by comparing participants' production choices on a motor task and a language task. The results indicate analogous patterns of Plan Reuse in both the motor and language tasks, such that hand choice and syntactic structure are repeated on consecutive trials. Plan Reuse may exist as a domain general heuristic for improving planning and production efficiency. Email: Amy L. Lebkuecher, axl413@psu.edu

6:00-7:30 PM (1094)

Individual Differences in the Production of Speech Errors. JULIE BANNON and KARIN R. HUMPHREYS, McMaster University - The study of speech errors has been fruitful in exploring the structure of the language system. Although the production of errors, and slips-of-the-tongue in particular, has been studied extensively, little is known about how individuals differ in their ability to produce error-free speech. The current study examines how individual differences in working memory, verbal and non-verbal intelligence, and cognitive control affect the rate and type of errors produced. Participants completed the SLIPS procedure to induce errors. Following this task, participants completed two measures of cognitive control, one measure of working memory, and a vocabulary test and matrix reasoning task to measure verbal and non-verbal intelligence respectively. The results of this experiment will shed light on the underlying cognitive mechanisms that support language production. This has implications for our understanding of the language system in relation to domain general cognitive functions and will contribute to our understanding of how individual differences in these domains affect speakers' ability to regulate their speech output.

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6:00-7:30 PM (1095)

Is Learning to Throw Also Learning to Toss?: Generalization in Verb Bias Learning. AMANDA C. KELLEY and GARY DELL, University of Illinois at Urbana-Champaign (Sponsored by Gary Dell) - Speakers are sensitive to how often individual verbs and sentence structures co-occur, or verb biases. Verb biases are modified through learning. However, it is not clear whether this learning applies to individual words, or whether it also generalizes to other verbs. This experiment examines this question in language production. First, participants learned new dative and transitive (active/passive) verb biases by using verbs in one sentence structure. Then, participants used both the trained verbs (e.g., throw) and synonyms of the trained verbs (e.g., toss) in sentences. For trained dative and transitive verbs, verbs were more likely to be used in the trained structure. Generalization was seen in untrained dative verbs - training throw affected the verb bias of toss - but not in untrained transitive verbs. Overall, these results suggest that learning biases for one verb induces changes at a conceptual level, but such changes do not impact all types of syntactic alternations. Email: Amanda C. Kelley, ackelle2@illinois.edu

6:00-7:30 PM (1096)

Re-Assessing the Relation of Phonological Short-Term Memory and Single Word Production. AUTUMN G. HORNE and RANDI C. MARTIN, *Rice University* (Sponsored by Randi Martin) – Previous findings from individuals with aphasia revealed a relation between phonological short-term memory (p-STM) capacity and speech rate in terms of words per minute in narrative production (Martin & Schnur, 2019), perhaps deriving from individuals' ease of retrieving phonological forms for single words, which affects both the rapidity of narrative production and rehearsal rate in STM tasks. However, contrary to prior findings (e.g., Allen & Hulme, 2006), in the current study testing healthy young subjects, we found no relation between word production latency for picture and digit naming and p-STM capacity. Also, speech rate did not correlate with p-STM capacity when only one word was repeated in the speech rate measure, though a correlation was found for three words. The findings argue against the phonological retrieval hypothesis for the relation of p-STM to narrative production, instead suggesting that both may depend on the capacity of a phonological output buffer.

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6:00-7:30 PM (1097)

Inhibition of Articulation Muscles During Listening and Reading: Input Modality and the Intention to 'Say It Loud' Matter. NAAMA RACHEL ZUR, ZOHAR EVIATAR, and AVI KARNI, University of Haifa - Intention to produce subsequent sounds affects articulation of speech (co-articulation). We show that intention to subsequently repeat a sentence, overtly or covertly, modulated articulatory muscles during listening and reading (i.e., input). Young adults were instructed to read (whole sentences or word-by-word) or listen to sentences to be repeated afterwards. Surface electromyography (sEMG) recordings of Orbicularis-oris and Sternohyoid muscles showed significant reductions in sEMG activity, compared to baseline, during input. Inhibition was contingent on intended response and input modality. When intended response was overt, inhibition was stronger compared to when intended response was covert. Listening compared to reading, when a covert response was intended, also resulted in stronger inhibition. Additionally, higher temporal resolution analyses showed different patterns of activity before the cue to respond, depending on input modality and intended response. Only when repetition was to be overt, significant build-up of activity occurred before the response cue, and was most pronounced when listening or reading wordby-word. Our results suggest that the interaction of perception and articulation begins already during input.

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6:00-7:30 PM (1098)

Profiling Language Impairment in Amyotrophic Lateral Sclerosis: Spelling. ELAINE H. NIVEN, University of Dundee, THOMAS H. BAK, University of Edinburgh - Cognitive change may occur in up to 50% of patients with Amyotrophic Lateral Sclerosis (ALS). While impairment is heterogeneous, language impairment is prevalent and difficulties in spelling may be a strong feature. There are indications that spelling errors made by patients may be observably different to those made by a nonpatient population. To investigate this suggestion, we obtained incorrect responses to standard spelling assessments from both ALS patients and from matched controls and presented these errors to 64 undergraduate students with no history of linguistics training. Participants rated the extent to which each error was a reasonable approximation of the correct spelling. Judgments indicating approximation were compared for patient and control generated errors. Our experimental approach to

analysis of spelling difficulties of patients with ALS provides a novel contribution to the emerging profile of language impairment.

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6:00-7:30 PM (1099)

How Well Does the Standard Model Apply to Reading in Arabic? Evidence from Typical and Atypical Readers. SANA TIBI, Florida State University - Cognitive and linguistic processes that underlie reading were investigated in a sample of 201 third grade Arabic-speakers. Children were administered measures of vocabulary, phonological awareness, naming speed, orthographic processing, morphological awareness, memory, nonverbal ability, and five reading outcomes. Hierarchical regression analyses were conducted for each of the five reading outcomes. Each of the constructs explained unique variance when added to the model. In the final models, PA was the strongest predictor, followed by MA. In a followup analysis, participants were divided into good and poor decoders, based on their pseudoword reading scores. Good decoders outscored poor decoders on every measure. Withingroup regression analyses indicated that poor decoders relied on more component processes than good decoders, suggesting a lack of automaticity. Variance in reading outcomes was better predicted for poor decoders. These results indicate that the standard predictors apply well to Arabic, showing the particular importance of PA and MA.

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6:00-7:30 PM (1100)

Exploring the Position-Coding of Tactile Stimuli. ANA BACIERO, ISABEL URIBE, and PABLO GOMEZ, DePaul University (Sponsored by Pablo Gomez) - Comparing the mechanisms that underlie visual and tactile (braille) reading has theoretical and practical implications. In the visual modality, transposed-letter nonwords (e.g., JUGDE) are more wordlike than replaced-letter nonwords (e.g., JUPTE) in what has been called the transposed letter (TL) effect. Braille readers, in contrast, do not show that effect, supporting models that assume perceptual uncertainty at assigning position to letters due to specific characteristics of the visual system. The present study aims to examine how non-braille readers encode the position of letters within a string; this, to assess if the lack of a TL effect is a consequence of braille literacy or is just a consequence of the features of tactile perception. We conducted a same/ different task in which we presented participants with two pairs of braille letters (i.e., a probe and a target/lure). The lure pairs were created by transposition of the letters of the probe, or by replacement of the probe's first letter, second letter, or both letters. Results did not show the usual transposition effect, suggesting that the difference between braille and sighted reading may be a reflection of the limitation of the visual and tactile sensory systems.

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6:00-7:30 PM (1101)

Word Frequency Effects During Reading for Comprehension and Skim Reading. KAYLEIGH L. WARRINGTON, KEVIN B. PATERSON, and SARAH J. WHITE, University of Leicester - Two experiments are presented examining effects of reading goals (reading for comprehension vs. skim reading) on lexical processing. Experiment 1 demonstrated frequency effects for both reading goals. However, there was an interaction such that first-pass effects of frequency were smaller during skimming compared to reading for comprehension. This finding builds on previous work examining effects of reading goals on lexical processing (Fitzsimmons, Weal & Drieghe, 2014; White, Warrington, McGowan, & Paterson, 2015), and indicates that reading goals can modulate lexical processing of fixated words during first-pass reading. Experiment 2 employs distributional analyses to further reveal the time course of effects of reading goals on lexical processing for fixated words. These experiments also provide a strong test of how reading goals might modulate the use of parafoveal lexical information in determining which words are fixated. The implications for effects of reading goal on lexical processing within models of eye movement control will be discussed.

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6:00-7:30 PM (1102)

Towards a Complete Model of Reading: Evaluating the Lexical Decision Performance of Über-Reader. AARON VELDRE, The University of Sydney, SALLY ANDREWS, The University of Sydney, LILI YU, Macquarie University, DENIS DRIEGHE, University of Southampton, ERIK D. REICHLE, Macquarie University - We describe simulations of the lexical decision task using Über-Reader, a new computational model that aims to provide a complete account of the perceptual, cognitive, and motor processes involved in reading (Reichle, 2019). The present simulations focused on Über-Reader's wordidentification module-an implementation of the Multiple-Trace Memory model (Ans, Carbonnel, & Valdois, 1998) based on the theoretical assumptions of the MINERVA 2 model of episodic memory (Hintzman, 1984)-with an expanded vocabulary comprising the entire corpus of the English Lexicon Project (Balota et al., 2007). The model's lexicon was probed with words and nonwords that varied in wordlikeness, and outputs of the resonance retrieval process were submitted to the Leaky Competing Accumulator model (Dufau, Grainger, & Ziegler, 2012) to evaluate performance on the lexical decision task. The outcomes of these simulations will inform further development of Über-Reader with the ultimate goal of simulating the reading process in its entirety.

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6:00-7:30 PM (1103)

Is Immediate Processing of Presupposition Triggers Automatic or Capacity-Limited? COSIMA SCHNEIDER, University of Tuebingen, NADINE BADE, University of Tuebingen, MARKUS JANCZYK, University of Bremen (Sponsored by Markus Janczyk) – A presupposition is a phenomenon whereby speakers mark linguistically the information that is presupposed, rather than actually uttering it. The current literature suggests an immediate processing of presuppositions starting directly on the respective word triggering the presupposition, and here we focused on two presupposition triggers, namely the definite determiner and *again*. Experiment 1 replicated the early effects in a selfpaced reading study. Experiment 2 then investigate whether this immediate processing of presuppositions is automatic or capacity-limited by employing the Psychological Refractory Period approach and the locus of slack-logic, which have been successfully employed for this reason in various fields of cognitive psychology. The results argue against automatic processing, but rather suggest that the immediate processing of presuppositions is capacity-limited. This potentially helps specifying the nature of the involved processes, for example, a memory search for a potential referent.

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6:00-7:30 PM (1104)

Differential Processing Between Repeated and Unique Letters in Strings. ILIYANA V. TRIFONOVA and JAMES S. ADELMAN, University of Warwick - Letters are often repeated in words in many languages. Previous visual word recognition research has not provided conclusive results regarding letter repetition effects in orthographic encoding of letter strings. However, recent evidence suggests delayed processing for words containing repeated letters (Trifonova & Adelman, 2019). The present work explored the mechanisms underlying processing of repeated and unique letters in strings across several paradigms. In a 2AFC perceptual identification (ID) task, the deletion or insertion of a letter was harder to detect when it was repeated than when it was unique (Exp. 1). In a masked-priming same-different task, deletion primes produced the same priming effect regardless of deletion type (repeated, unique; Exp. 2), but insertion primes were more effective when the additional inserted letter created a repetition than when it did not (Exp. 3). In a hybrid same-different ID task, foils created by modifying a repetition, by either repeating the wrong letter or replacing a repeated letter, were harder to reject than foils created by modifying unique letters (Exp. 4). The results demonstrate differential processing between repeated and unique letters not anticipated by current accounts. Email: Iliyana V. Trifonova, i.v.trifonova@warwick.ac.uk

6:00-7:30 PM (1105)

Psychometric Properties of a Spelling Recognition Lexical Expertise Measure. JOCELYN R. FOLK, MEGAN E. DEIBEL, SHAUNA DE LONG, and ASHLEY N. ABRAHAM, *Kent State University* (Presented by Jocelyn Folk) – Individual differences in lexical processing are well-established in the reading literature (Andrews, 2012; see also Folk & Eskenazi, 2016 for a review). There has been strong evidence for spelling skill as an important component of lexical expertise, which may outperform the predictive abilities of other measures of reader skill, such as reading comprehension tests, vocabulary tests, and reading speed (Andrews, 2012). Two common ways of measuring spelling skill are through spelling recall tests, in which participants are asked to write the correct spelling to a spoken word (e.g., Andrews & Bond, 2009), or

spelling recognition tests, in which participants are asked to differentiate between correct and incorrect written spellings. In the current study, we analyzed the psychometric properties of a spelling recognition test used in reading research to measure lexical expertise and which correlates highly with spelling recall (e.g., Eskenazi, Swishchuk, Folk & Abraham, 2018). Internal consistency, item-classification analyses, G-theory analyses, and IRT analyses were examined. Overall, patterns indicated that the measure was stable across multiple data collections with reasonably discriminant and difficult items. Email: Jocelyn R. Folk, jfolk@kent.edu

6:00-7:30 PM (1106)

The Missing Letter Effect in Missing in Spanish. CESAR E. RIANO RINCON and GARY E. RANEY, University of Illinois at Chicago (Sponsored by Gary Raney) - Research has shown that the cognitive processes involved in text comprehension change as language proficiency changes (Bovee & Raney, 2016). One task used to measure word processing is the letter detection task. In this task people are asked to read normally while circling a target letter. A common finding is that people miss more target letters in function words than in content words, which is called the Missing letter effect (MLE). This implies less attention is given to function words. Bovee and Raney had individuals who were proficient in English and moderately proficient in Spanish perform the letter detection task on English and Spanish texts. The found a large MLE for English and a reversed MLE (better letter detection accuracy for function words) for Spanish texts. We repeated their procedure using proficient English-Spanish bilinguals who were English dominant or Spanish dominant. For English texts, we found a large MLE for English dominant speakers and a small MLE for Spanish dominant speakers. For Spanish texts, we found no MLE for either group. Our findings demonstrate that the "normal" MLE does not exist for Spanish, and that language proficiency doesn't explain the reversed MLE found by Bovee and Raney.

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6:00-7:30 PM (1107)

The Word Superiority Effect in Arabic and English. YOUSRI MARZOUKI and SARA AL-OTAIBI, Qatar University, JONATHAN GRAINGER, Aix-Marseille University & CNRS - We examined the word superiority effect in Arabic and English using three types of context: words, pseudowords, and nonwords. Given the graphical and morphological complexity of Arabic words, we hypothesized that letter identification in Arabic would be more sensitive to context than in English. Forty Arabic-English bilinguals performed a post-cued letter-instring identification task. There was a robust effect of context in both languages. Interestingly, the presence of a triple interaction between Language, Context, and Position revealed a mirror effect between Arabic and English regarding the importance of outer-letters. There was a consistent first-letter advantage in English regardless of context, whereas it disappeared in the nonword context in Arabic. The final letter advantage was consistent across conditions in Arabic but disappeared

in the nonword context in English. Thus, specificities of the orthography modulate the shape of the serial position function for letter-in-string identification.

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6:00-7:30 PM (1108)

Consonant-Vowel Structure and Transposition Effects in Masked Priming. LUCIA COLOMBO, Università degli Studi di Padova, GIACOMO SPINELLI and STEPHEN J. LUPKER, University of Western Ontario - In Spanish-language studies, transposed-letter (TL) priming effects in masked priming lexical decision tasks exist when two nonadjacent consonants are transposed (caniso-CASINO), but not when two nonadjacent vowels are transposed (cinaso-CASINO). Control primes involve replacing the two transposed letters with different letters (e.g., caviro-CANISO, cesuno-CASINO). This pattern seems to imply that the consonant-vowel (CV) structure of the letter string is important early in orthographic processing, before lexical activation occurs and before the word's phonology is computed. Somewhat in contrast, in four experiments, equivalent priming effects were observed for adjacent CC, VC and CV transpositions, in both English and Italian. In a final experiment, we extended these manipulations (in Italian) to adjacent VV transpositions with the vowel pair being either a diphthong (genaile-GENIALE) or a hiatus (ocaeno-OCEANO) pair. Results again showed significant TL priming and no interaction. At least in these two languages, consonant-vowel status appears to play no role in TL priming when the transposed letters are adjacent.

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6:00-7:30 PM (1109)

Parafoveal Processing of Phonetic and Semantic Radicals in Chinese Reading. FEDERICA DEGNO, University of Central Lancashire, LIXIN WEI, Tianjin Normal University, SIMON P. LIVERSEDGE and CHUANLI ZANG, University of Central Lancashire - Over 80% of frequent Chinese characters comprise of a phonetic and a semantic radical and studies have shown reliable semantic and phonetic preview effects in reading. However, the influence of each type of radical on parafoveal character processing is currently not known. In an eye movement experiment we used the boundary paradigm to manipulate the parafoveal preview of one, or both, radicals of a single character with either a left-to-right or a right-toleft structure. Reading times were shortest when both radicals appeared in the parafovea, longer when one of the two was masked, and longest when both were masked. We are currently examining trends suggesting that parafoveal disruption of the phonetic compared to the semantic radical is more costly to processing in characters with a left-to-right structure. We will discuss our findings in relation to psychological models of Chinese word recognition and eye movement control during reading.

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Parafoveal Processing in Chinese Reading: Evidence for the Multi-Constituent Unit (Mcu) Hypothesis. CHUANLI ZANG, University of Central Lancashire, YING FU, HONG DU, ZIJIA LU, XUEJUN BAI, and GUOLI YAN, Tianjin Normal University, SIMON P. LIVERSEDGE, University of Central Lancashire - Unlike English, Chinese is a character-based, unspaced language. An intriguing question concerns how lexical processing in Chinese is operationalized across words, phrases or other linguistic units. Particularly, we were interested in processing of frequently occurring Multi-Constituent Units (MCUs), that is, linguistic units comprised of more than a single word, that might be represented lexically. We have conducted four experiments in which we manipulated the linguistic category of a multi-constituent Chinese string (a word, a MCU, or a phrase), and the preview of its constituent (identical or pseudocharacter) using the boundary paradigm (Rayner, 1975). The boundary was located before the target string. Results showed very consistent patterns such that preview effect was more pronounced when the constituents of a string formed a word or a MCU, compared to a phrase, demonstrating that frequently occurring MCUs are lexicalized and processed parafoveally as a single unit during Chinese reading. Email: Chuanli Zang, CZang@uclan.ac.uk

6:00-7:30 PM (1111)

Two Word Recognition Paradigms: Evidence from Eye Movements. PETER SHLANTA and JANE ASHBY, Central Michigan University (Sponsored by Jane Ashby) - The present study explores two-word recognition paradigms by investigating how presentation type (parafoveal preview vs. masked priming) affects eye movements during word recognition. Eye movements were monitored during an isolated word reading task as participants read target words presented either at the reader's point of fixation (masked prime) or 2° to the right of their fixation (parafoveal preview). Targets (e.g., hospital) appeared in three preview conditions: identity (hospital), transposed-letter (hsopital), and consonant string preview (kcvmzsd). Preliminary analyses indicate that mean first fixations were about 65ms shorter in the parafoveal preview condition than in the masked prime condition. The TL effect was ~10ms larger in the masked prime condition than in the parafoveal preview condition.

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6:00-7:30 PM (1112)

The Effects of Perceptual Fluency on Emotional Word Recognition. JOSEPH M. NIDEL and MARC F. JOANISSE, *University of Western Ontario* (Sponsored by Marc Joanisse) – We investigated whether making a word harder to read (i.e., *disfluent*) attenuates the influence of its affective qualities. In a word recognition experiment, adults read familiar English words ranging in valence and arousal based on norms from Warriner, Kuperman, and Brysbaert (2013). Fluency was manipulated by presenting words in easier and harder to read fonts. Contrary to expectations, we found that affective influences of words on word naming RTs were not attenuated in the disfluent font condition; in fact, the facilitative effects on RT

typically found with increasing valence were slightly stronger in the disfluent condition. Similarly, increasing arousal sped RT significantly more for words presented in the disfluent font compared to words presented in the fluent font. Email: Joseph M. Nidel, jnidel@uwo.ca

6:00-7:30 PM (1113)

Phonological Density Facilitates Visual Word Recognition in a Silent Reading Task: Evidence from the N400. LEE KNAPP, JOHN F. SHELLEY-TREMBLAY, and MARK YATES, University of South Alabama - Previous research has indicated a facilitative effect of phonological neighborhood (PN) density on visual lexical decisions. In the current research, this facilitative effect was examined by use of event related potentials (ERPs). Electroencephalographic (EEG) data were collected using a 40-channel electrode cap with the standard 10-20 system for locations. The electrodes were broken into three arrays. The EEG data were epoched into ERP data that were divided into fourtime frames (90-140, 140-290, 290-490, 490-890 milliseconds). Words with high PN density were responded to more rapidly and more accurately when compared to the words with low PN density. Interestingly, a larger N400 was found in the low PN density words, suggesting that the N400 is modulated by the phonology of a word. We argue that words with lower PN density rely more on semantic processing resulting in larger peaks of the N400 region. Results are discussed in terms of the cross-code consistency hypothesis.

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6:00-7:30 PM (1114)

Does Saying a New Word out Loud Help to Learn It Better? EFTHYMIA C. KAPNOULA, Basque Center on Cognition, Brain and Language, ARTHUR G. SAMUEL, BCBL; Stony Brook University; Ikerbasque - Previous research on the effect of production on word learning is inconclusive. For example, Zamuner et al. (2016) found a facilitatory effect of production, whereas Leach and Samuel (2007) found a detrimental effect. In addition, when producing a word, we unavoidably hear it by an additional speaker (ourselves), which points to the need to control for this additional speaker variability. The current study examines the effect of production taking into account speaker variability. Participants learned new words, associating each one with an unfamiliar picture. On each trial, participants heard the word twice: (1) by the same speaker, (2) by different speakers, or (3) by hearing it and producing it themselves. After training, participants heard each word and chose its referent between two pictures (target and foil). Accuracy, RT, and eyemovements to the pictures were collected. Results revealed an interaction: There was an early facilitatory effect of production that switched to a detrimental effect after additional training. The results help to reconcile the conflicting prior findings regarding the role of production on word learning. Email: Efthymia C. Kapnoula, kapnoula@gmail.com

6:00-7:30 PM (1115)

An Eye-Movement Exploration into Return-Sweep Saccade Targeting During Reading. MARTIN R. VASILEV and TIMOTHY J. SLATTERY, *Bournemouth University* (Presented by Martin Vasilev) - Return-sweeps take the readers' eyes from the end of one line of text to the start of the next. While return-sweeps are common during everyday reading, the eye-movement literature is dominated by single-line studies where no return-sweeps are needed. The present experiment explored what readers are targeting with their return-sweeps. Participants read two stories while their eye-movements were being recorded. In one story, every line-initial word was highlighted by formatting it in bold, while the other story was presented normally (i.e., without any bolding). The bolding manipulation significantly reduced the oculomotor error associated with return-sweeps, as these saccades landed closer to the left margin and were less likely to require corrective saccades compared to the control condition. However, despite this reduction in oculomotor error, return-sweep landing sites were not impacted by the length of line-initial words, nor was there an interaction between bolding and word length. This suggests that readers were not targeting the centre of line-initial words, but rather some area relative to the left text margin. We discuss the implication of these findings for return-sweep targeting and eye-movement control during reading. Email: Martin R. Vasilev, mvasilev@bournemouth.ac.uk

6:00-7:30 PM (1116)

Differential Effects of Blocked and Interleaved Training on a Same-Different Category Judgment Task. XINYI LU, University of Waterloo, DONNA COCH and SEAN H.K. KANG, Dartmouth College (Sponsored by Sean Kang) - How exemplars are sequenced during study affects category learning. It has been proposed that blocked presentation of exemplars draws attention to similarities within a category, whereas interleaved presentation draws attention to differences across categories. We tested this hypothesis using a same-different category judgment task. First, participants were trained on three categories of birds in either a (mostly) blocked or interleaved fashion. Then they viewed pairs of novel exemplars and judged whether the second item was from the same category as the first. Based on norming, similarity was controlled across both training/testing exemplars and same/different test pairs. Training condition did not influence overall accuracy, but participants in the blocked (as compared to interleaved) condition were more accurate for "same" pairs and more likely to respond "same." This more liberal criterion for "same" judgments and related improved accuracy may be a reflection of the hypothesized increased focus on similarities during blocked study. Email: Xinyi Lu, xinyi.lu@uwaterloo.ca

6:00-7:30 PM (1117)

The Effect of Interleaving Versus Blocking on Category Learning: A Meta-Analysis. BRENDAN A. SCHUETZE, University of Texas, Austin, VERONICA X. YAN, University of Texas, Austin, LUKE G. EGLINGTON, University of Memphis – Numerous studies have shown a learning benefit of interleaved presentation of exemplars from different categories, relative to a blocked schedule (e.g., AABB vs. ABAB; Kang & Pashler, 2012). One explanation of this finding has been that interleaving enhances discrimination between categories (Carvalho & Goldstone, 2015); another is that interleaving allows for spaced practiced to enhance memory (Birnbaum et al., 2013). The discrimination hypothesis predicts that effect should be moderated by category structure and study activity; the spacing hypothesis predicts that the effect should be moderated by number of categories. In the present metaanalysis, we evaluated the overall effect of interleaving and explored moderators relating to theoretical mechanisms and generalizability. We found an overall medium benefit of interleaving. But critically, the effect was also moderated by category similarity, study activity, task stimuli type, and number of categories and examples. Lastly, we make recommendations for more systematic approaches to examining experiment parameters.

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6:00-7:30 PM (1118)

Frequency Effects in Causal Learning. HILARY J. DON, ASTIN C. CORNWALL, and DARRELL A. WORTHY, Texas A&M University - Recent work has shown that people learn more about the cumulative frequency of rewarding outcomes than the probability of receiving reward. In this study, we examined whether causal judgments are more affected by the frequency or probability of an outcome. Participants were asked to assume the role of a doctor trialing new drug treatments for a disease. On each trial, they selected between two drug options to administer to a new patient and observed whether or not the patient's health improved. During training, participants selected between pairs of options that had outcome probabilities of .60 (A) vs .40 (B), or .80 (C) vs .20 (D). Importantly, there were twice as many AB trials than CD trials, such that option A was associated with greater cumulative instances of improved health, while option C had a higher probability of improved health. In a test phase, participants chose between novel combinations of drug options. On critical AC trials, there was greater choice of option A, indicating a preference for the option providing a frequently occurring outcome over the option with higher probability of the outcome. Efficacy ratings for each drug were also affected by the frequency of cue presentation. Email: Hilary J. Don, hilary.don@tamu.edu

6:00-7:30 PM (1119)

Does Gesture Support Learning in an Online Environment? MARY ALDUGOM and SUSAN COOK, University of Iowa - Gesture at instruction enhances math learning. When instructors use hand gestures at instruction, learners outperform those who learn the same concept with only speech, retain the new information over time, and are better able to generalize this learning. However, the majority of this work has been done in laboratory settings and so findings may not generalize across learning contexts. In Study 1, we investigated the effect of gesture in online instruction. Participants (n =150) completed Qualtrics surveys where video instruction on a novel abstract mathematical task included either speech and gesture or only speech. After instruction, participants completed a posttest to assess learning. Laboratory findings with the same stimuli found that instruction with gesture was superior to only speech. Online, there was not a significant difference in posttest performance between those who had learned with speech

and gesture and those who had learned with only speech. One possibility is that screen size enhances or restricts an individual's ability to benefit from gestures. Study 2 will address this possibility by randomly assigning participants to observe the instructional videos either on a smart phone or a computer monitor.

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6:00-7:30 PM (1120)

The Instructor's Face as a Source of Attentional Cues in Video Lectures. ANDREW THOMAS STULL, University of California, Santa Barbara, LOGAN FIORELLA, University of Georgia, REBECCA SIMILUK and RICHARD E. MAYER, University of California, Santa Barbara - Does access to an instructor's face and eye gaze in an instructional video foster engagement and lead to improved learning? College students were randomly assigned to watch a video lecture about kidney anatomy where the instructor either faced the camera and occasionally turning to write on the board (gaze shifting) or faced the board without looking at the camera (no gaze shifting). Students' dwell times on the instructor and board were recorded with eye-tracking technology. All students completed retention and transfer tests. Results indicate better retention (d = 0.55)and transfer (d = 0.55) when the instructor shifted gaze between the camera and board. The no gaze shifting group attended less to the instructor than the gaze shifting group (d = 3.1) but more to the instructor when the instructor was looking at the board (d = 0.63). These results contribute to a theory of instructor presence in video lectures.

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6:00-7:30 PM (1121)

Do People Use Source Reliability Cues When Encoding Tweets? Science Says No!. MIJA VAN DER WEGE, LAUREN CAROTHERS-LISKE, CECILY CONOUR, YUXIN DENG, KENNEDI HAIRSTON, YUMEKA HIRAYAMA, IAN KPACHAVI, TRACY LEBLANC, ALEXIS TOLBERT, and RAN ZHENG, Carleton College (Presented by Mija Van Der Wege) -Social media is increasingly used as a source of information for people (Kwak et al., 2010). Unfortunately, not all of this information is true, and people may be repeatedly exposed to misinformation (Kim et al., 2018). In lab studies, repeated statements receive higher truth ratings than new statements regardless of previous knowledge or source validity, leading to a reliance on fluency (i.e., the illusory truth effect; Unkelbach & Stahl, 2009; Dechene et al., 2010; Fazio et al., 2015). Using updated norms of general knowledge items from Tauber et al. (2013), we sought to replicate the illusory truth effect in a simulated Twitter context, exploring whether tweeter reliability affected the encoding of true and false information. Perceived Twitter reliability has been found to be related to the number of followers and number of retweets (Westerman et al., 2012; Lin et al., 2016). We looked at these factors, as well as verification marks, Twitter handles, and profile pictures. In two studies, we found limited effects of source reliability

on perceived knowledge of facts. At least in this experimental context, people seem to pay little attention to source reliability cues on Twitter.

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6:00-7:30 PM (1122)

Using Text Analysis to Explore Statistics Learning. MARY C. TUCKER, STACY T. SHAW, and JAMES W. STIGLER, University of California, Los Angeles - A key goal of education is to help students develop an interconnected system of knowledge. Yet, measuring the development of connected understanding remains a critical educational challenge. Natural language processing tools offer potential to identify patterns of understanding in text produced during learning (Worsley & Blikstein, 2011; Crossley et al., 2016), but are not widely implemented in STEM domains. This poster presents an exploratory analysis of text features of students' constructed responses produced during a 10-week introductory statistics course. The course applies design concepts from Son et al. (2018)'s "practicing connections" hypothesis by incorporating a unified conceptual structure and includes over 1200 embedded formative assessments- many of which include open-ended prompts. In the current study we explored indices of word frequency, cohesion, and lexical sophistication and their relation to student understanding, captured by average performance across five cumulative assessments. Results indicate that word count, descriptive words, and semantic overlap are associated with increased understanding, controlling for demographics and prior math performance.

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6:00-7:30 PM (1123)

Applying Cognitive Psychology Research Findings to the College Classroom: Providing Evidence-Based Instruction Techniques to Faculty. JENNIFER QUEEN, Rollins College, JESSICA E.D. ALEXANDER, Centenary College of Louisiana, BRANDY TIERNAN, Sewanee: The University of the South (Presented by Jennifer Queen) - College professors may not craft courses and assignments with students' cognitive systems in mind. Cognitive psychologists know a lot about how people take in, store, and use information (the basic description of our discipline). However, most of this work is done in the confines of the laboratory under tightly controlled conditions that allow researchers to make causal links, but it does not resemble the college classroom environment. Cognitive psychologists at SLACs are familiar with the literature of our discipline, but we also have classroom experience that can help translate that literature for colleagues. We created modules in a free version of Canvas on how to incorporate into pedagogy design established principles from the cognitive literature that have the potential to aid student learning. These modules contain basic information in a digestible form for faculty across disciplines as well as specific suggestions for course or assignment modification that could be implemented. Fifteen faculty members (3 institutions and 10 disciplines) completed the modules. Based on this data, the modules seem to be efficient ways to help instructors learn research-based techniques and generate ideas to implement them in their classes.

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6:00-7:30 PM (1124)

Does Enhancing Memory for Key-Term Definitions Facilitate Comprehension? NOLA DALEY and KATHERINE RAWSON, Kent State University - Two important learning goals are identifying and applying content in contexts that differ from the original learning context. The extent to which improving memory for key-term definitions can facilitate the subsequent identification and application of those concepts is unclear, due to conflicting results of previous work. To provide a stronger test of the influence of memory on comprehension, the current study aimed to achieve greater levels of memory than in previous research. To that end, students studied a textbook passage and then either did or did not receive memory training for the key-term definitions in the text. Training involved cued recall practice to a criterion of three correct recalls. Two days later, performance on comprehension tests involving identification and application was greater for those who did versus did not receive memory training. This effect on comprehension remained even when students were allowed to reference the key-term definitions during the comprehension test. Thus, enhancing memory for key-term definitions facilitates comprehension.

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6:00-7:30 PM (1125)

Verbatim and Paraphrased Note-Taking in the Classroom. CAITLIN PRATT and JACLYN MAASS, University of Central Oklahoma - Since research suggests taking notes in your own words is beneficial to learning (e.g., Fiorella & Mayer, 2015, Peper & Mayer, 1986), the current work investigated the effects of paraphrased and verbatim lecture note taking. We examined note taking through two avenues: a naturalistic classroom study and a lab-based experiment. For the first portion, we collected 26 students' notes from two sections of an undergraduate biological psychology course. Each statement in the notes was coded as "verbatim," "paraphrased," or "new" based on how closely it matched the lecture slides. The frequency of each of these types of statements was correlated with exam scores. In the experimental portion, undergraduate students were randomly assigned to either take only verbatim notes or take only paraphrased notes while watching a 15-minute video of a biological psychology lecture. Scores on a one-week delayed post-test were compared between conditions. Email: Caitlin Pratt, cpratt5@uco.edu

6:00-7:30 PM (1126)

Testing the Interleaving Effect Across Several Domains and Grade Levels. FARIA SANA, *Athabasca University*, VERONICA X. YAN, *University of Texas, Austin*, MEERA SHARMA, *McMaster University* – Interleaving studies do not capture the range of typical classroom instruction—they are typically laboratory studies with test delays of 5-20 minutes, and the majority include the learning of visual categories or relatively simple cognitive concepts (e.g., mathematics formulae). However, in educational contexts, the goal is much longer term-final tests occur weeks and months after the concepts are introduced, and the concepts are likely to be more complex and interrelated. We examined the efficacy of the interleaving on much more complex conceptual learning, over the course of four weeks across different domains (biology, chemistry, and physics) and grade levels (9-12). In eight classes, students took four weekly practice tests based on the target concepts taught that week. Two of those tests were blocked, such that questions related to a single concept were grouped together, and two were interleaved, such that questions on different concepts were mixed up in a random order. The final test, administered one month later, included both the target and control concepts taught during the four weeks. The goal of this study is to examine the generalizability and robustness of the interleaving effect beyond controlled laboratory settings. Email: Faria Sana, fsana@athabascau.ca

6:00-7:30 PM (1127)

Multimodal Learning in a Multisensory Environment. DENISE N. STEPHAN, RWTH Aachen University, IRING KOCH, RWTH Aachen University - Learning is the most important human ability. Since our environment is multisensory, the process of learning novel motor skills is guided by sensory information presented in different modalities. Moreover, human motor skills and thus behavior is usually a combination of actions in different modalities (i.e., multimodal) and far more complex than displayed by current experimental research. In a nutshell: Learning is multimodal guided by a multisensory environment. Thus, the aim of the presented study was to explore multimodal aspects of sequence learning. More specifically, a modified multimodal SRT task was used to manipulate modalities on two independent levels: a) Multisensory Stimulation (e.g., visual and auditory), b) Multimodal Action (e.g., manual and vocal). In these experiments, we demonstrated the important and partly beneficial effect of employing multisensory stimulation and multimodal actions for sequence learning, allowing a better understanding of the mechanisms behind multisensory learning of multimodal actions.

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6:00-7:30 PM (1128)

Learners Require Considerable Support to Learn from Experience About the Benefits of Testing. MICHELLE L. RIVERS (Graduate Travel Award Recipient), JOHN DUNLOSKY, and MASON MCLEOD, *Kent State University* (Sponsored by John Dunlosky) – Students' metacognitive judgments do not always reflect the mnemonic benefits of testing over restudy, but study-test experience with feedback can help (Tullis, Finley, & Benjamin, 2013). We investigated the extent to which students can generate their own feedback about strategy effectiveness during learning. Across two cycles, participants studied word pairs, practiced each pair through either restudying or testing, predicted how many pairs of each type they would recall, then took a final test on the pairs. During this test, participants either received feedback or attempted to generate their own feedback about the number of restudied and tested pairs they had correctly recalled. During cycle 1, participants predicted they would recall an equivalent number of tested and restudied pairs, although they actually recalled more of the tested pairs. During cycle 2, only those who received feedback at test predicted that they would recall more tested than restudied pairs. However, when the testing effect was much larger (Experiment 2), participants who generated their own feedback also updated their knowledge to reflect the testing effect. Thus, under certain conditions, students can learn from experience about the benefits of testing.

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6:00-7:30 PM (1129)

The Impact of Father-Child Play Interactions on Cognitive Development. EMILY E. FREEMAN and ERIN ROBINSON, University of Newcastle - Father-child play has received increased attention over the past decade as the importance of fathers in child development has been recognised. Researchers have shown, for example, that high quality play is related to improved self-regulation in children and fewer behavioural problems. Many of these studies have focused on rough-and-tumble play, which is a highly arousing, play wrestling, type of play that may appear somewhat aggressive if it wasn't accompanied by clear signs of enjoyment, such as laughter. Further, these studies have tended to explore child behaviour as their outcome metric, often with a specific focus on externalising problems. The aim of this study was to examine the relationship between a variety of play interactions and child cognitive development. The central questions included whether father-child play is related to cognitive outcomes in children, which types of play have the strongest relationship, and which areas of cognitive development are most strongly affected.

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6:00-7:30 PM (1130)

The Attentional Boost Effect: An Encoding Boost for Intentional and Incidental Learning. STEPHANIE C. CROCCO and JAMES H. NEELY, University at Albany, SUNY (Sponsored by Stephen Schmidt) - When key presses are made to red circles sequentially intermixed with green circles, a word paired with a red target circle (called a target word, T) is better remembered than a word paired with a green distractor circle (called a distractor word, D). This attentional boost effect (ABE) has typically been evaluated when subjects are given intentional learning instructions for the upcoming word memory test. We found word recognition was better for those using intentional learning than those not told about the memory test (i.e., incidental learning). For both types of learning, memory for a D given immediately after a T (DAfter) was worse than equivalent memory for a D given immediately before a T (DBefore) or remote from a T (DRemote). An ABE occurred for Ts, relative to all three D types. Because red circle responses boosted T memory but harmed DAfter memory, the ABE is due to a boost in encoding rather than solely due to a key press making a T more distinctive than a D at retrieval. The encoding locus of the ABE was further supported by key press RTs and word-naming RTs recorded during the word study list.

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6:00-7:30 PM (1131)

Do Super Recognizers Process Faces More Holistically? Evidence from Eye Movement Data. SONIA AMADO, ELIF YÜVRÜK, IRMAK SU TÜTÜNCÜ, and AYCAN KAPUCU, Ege University (Presented by Sonia Amado) - This study aimed to investigate face processing strategy differences between super recognizers (SRs) and non-SRs by using inversion effect and eye movement methodology. We hypothesized that SRs process faces more holistically, therefore show more salient inversion effect compared to non-SRs. Seventy-two students participated (five SRs) in this experiment. They studied 20 neutral faces and completed an old-new recognition test in which half of the neutral faces were presented inversely to disrupt holistic processing while eye movements have been recorded during encoding and retrieval. Inversion effect indicated by lower accuracy, and more frequent and shorter fixations for inverted faces was observed in all participants. Contrary to our expectations, this inversion effect was not larger for SRs compared to non-SRs. Analysis of eve movements during encoding are still ongoing. This study provides a more extensive explanation for the underlying mechanisms of super face recognition ability.

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6:00-7:30 PM (1132)

The Details Are in the Difficulty: Incidental Recognition of Objects' Perceptual Details Following Visual Search. MICHAEL C. HOUT, New Mexico State University, JUAN D. GUEVARA PINTO and MEGAN H. PAPESH, Louisiana State University (Presented by Michael Hout) (Sponsored by Michael Hout) - Although the goal of efficient visual search is to prioritize targets (rather than distractors), research consistently shows that observers nevertheless remember distracting objects. These effects are often exacerbated when search is challenging. The current study investigated whether these difficulty-enhanced distractor memories are characterized by precision, as in other visual long-term memory studies, or gist, as would be expected given the task-irrelevant nature of distractors. Across four experiments, observers were cued to search picture arrays for either multiple targets (Experiments 1a and 1b) or categoricallydefined targets (Experiments 2a and 2b). Incidental memory was assessed by surprise 4- or 16-AFC memory tests presented after the search task, and memory fidelity was examined by manipulating the exemplar-lure similarity at test. Observers remembered more objects encountered during difficult, relative to easy, search trials, replicating prior work. They also, however, remembered them with greater detail, indicating that observers incidentally store perceptually-rich object representations. Email: Juan Guevara Pinto, jgueva3@lsu.edu

6:00-7:30 PM (1133)

Selective Attention and Recognition: Sequential Congruency Effects in Memory? HANAE DAVIS and BRUCE MILLIKEN, *McMaster University* – Recent studies have reported superior recognition for stimuli studied beforehand as incongruent targets compared to congruent targets in a selective attention task (Krebs, Boehler, De Belder, & Egner, 2015; Rosner, D'Angelo, MacLellan, & Milliken, 2015). These findings point to a possible link between selective attention demands and memory encoding. To examine this issue, we evaluated whether congruency effects in recognition involve mechanisms discussed in the cognitive control domain. We derived predictions from the conflict monitoring model (Botvinick, Braver, Barch, Carter & Cohen, 2001) for how trial-to-trial control adjustments might transfer to later recognition performance, and then compared those predictions to the results of a comprehensive sequential congruency analysis based on all data we had available. The results did not correspond to the predictions. We discuss the results with respect to a stage-specific account of desirable difficulty effects offered recently by Ptok, Thomson, Humphreys and Watter (2019).

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6:00-7:30 PM (1134)

Is Adaptive Memory Universal?: An Exploration of Survival Memory in a Sub-Saharan African Population. DANA M. BASNIGHT-BROWN, United States International University, STEPHANIE KAZANAS, Tennessee Technological University, JEANETTE ALTARRIBA, University at Albany, SUNY -Within the last decade, research focused on human memory has investigated whether the processing of survival relevant or contamination information enhances memory across various scenarios. Specifically, studies have shown that processing words based on their survival value or degree of contamination facilitates later memory recall (Bonin, Thiebaut, Witt, & Meot, 2019). However, a recent meta-analysis has suggested that there is potential bias concerning the effect, which has led some to question the robustness of this type of memory enhancement (Scofield, Buchanan, & Kostic, 2018). Given that the exploration of the survival advantage has focused primarily on Western samples, or those referred to as WEIRD populations which are not often representative of the majority world (Western, Educated, Industrialized, Rich, and Democratic, see Henrich, Heine, & Norenzayan, 2009), the current study was designed to explore the effects of survival and contamination variables in a Nonwestern population. Results from a Sub-Saharan African population revealed differences from those commonly reported in Western samples and will be discussed in terms of the crosscultural variables moderating these effects.

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6:00-7:30 PM (1135)

Offloading and External Memory Manipulation: The Effect of Delay. MEGAN O. KELLY and EVAN F. RISKO, University of Waterloo (Sponsored by Evan Risko) – Using external aids has long allowed us to skirt the capacity limitations of our memory. While offloading is an effective strategy, recent work suggests that memory for offloaded information is susceptible to manipulation. Various factors likely play a role in one's sensitivity to stored information that has been surreptitiously altered. In the current investigation, we presented participants with to-be-remembered items that they encoded into a computer file (i.e., offloaded). After offloading, access to this file was given to participants during a recognition task occurring after either a short (30 s) or long (15 min) delay. Critically, on the final trial, a researcher inserted a novel word into the file when it was out of participant view. Participants were then given access to the altered file during a recognition task containing the original items, plus the inserted item. Those in the long condition reported higher confidence (though, not statistically higher) in the inserted item, and reported relying on the external store significantly more than those in the short condition. Our findings contribute to a better understanding of how memory for offloaded information is susceptible to manipulation.

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6:00-7:30 PM (1136)

Contributions of Temporal Expectation to Item-Specific Memory. MRINMAYI KULKARNI, University of Wisconsin-Milwaukee, DEBORAHE. HANNULA, University of Wisconsin-Milwaukee (Sponsored by Deborah Hannula) - Regular temporal progression of events can drive predictions about when something will occur, and these expectations can affect behavior. For example, it has been reported that the entrainment of attention by imposed temporal structure improves visual perception. Whether similar benefits might be documented in studies of episodic memory remains underexplored, though results from one study indicate that temporally-regular encoding structure leads to better real-world scene recognition. Here, we investigated whether improvements are evident when detailed, item-specific memory representations are required for successful recognition. In separate encoding blocks, participants viewed images of objects presented with either predictable or randomized timing. Following encoding, images of old, similar, and new objects were presented, and participants made recognition decisions. In contrast to predictions, regular event timing did not improve memory for item detail. These results suggest that indirect upregulation of attention through imposed temporal structure may not be sufficient to improve memory performance.

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6:00-7:30 PM (1137)

Final Destination: Memory! Determinants of Remembering to Whom You Gave What. LILIANE WULFF and NIKOLETTA SYMEONIDOU, University of Mannheim (Sponsored by Beatrice G. Kuhlmann) - Destination memory refers to remembering the receiving person (i.e., destination) of an information or item. In two computer-based experiments, we examined to what extent familiarity of the destination and type of interaction influence destination memory. Across experiments, individuals assigned objects (e.g., bike) to either of two persons. In Experiment 1, familiarity of these destinations (uncommon names vs. names of participants' relatives or friends) was manipulated between participants. In Experiment 2, type of interaction (lending an object vs. giving it as a gift to either of two familiar destinations) was manipulated within participants. In a subsequent memory test, participants in both experiments decided whether, and if so to which destination, they previously gave the object (and whether they had lent or given the object as a gift; only in E2). As hypothesized, multinomial processing tree model analyses revealed that destination memory was better for interactions with familiar destinations (E1). However, destination memory did not differ for the type of interaction (E2). Our research contributes to a more comprehensive picture of destination memory using individualized destinations and advanced statistical analyses. Email: Liliane Wulff, wulff@psychologie.uni-mannheim.de

6:00-7:30 PM (1138)

Cross-Cultural Differences in Object Memory. KRYSTAL LEGER and ANGELA GUTCHESS, Brandeis University -Culture can influence memory in a number of ways. Westerners tend to be more focused on individual features and objects whereas East Asians' attention is more holistic, placing increased value on context and relationships. Our lab has previously demonstrated that cultures can differ in the memory specificity for pictures of objects. The present study advances our understanding of this observed difference by investigating how the effect varies depending upon task difficulty and also using a signal detection model to better specify the differences in memory discrimination that exist between the two groups. In this experiment, 36 participants from each cultural group (Americans and East Asians, neither of which have lived outside their native country more than 5 years) viewed images of common objects and then completed a memory test discriminating previously studied objects from similar and completely novel objects. Signal detection analyses indicate a greater ability for Americans to discriminate between similar items than East Asians. Additionally, we observed that this difference was most apparent when the similar items were easy to distinguish from previously-studied counterparts. Email: Krystal Leger, kleger@brandeis.edu

6:00-7:30 PM (1139)

What Survives an Instruction to Forget? ANJALI PANDEY and TRACY L. TAYLOR, Dalhousie University (Sponsored by Tracy Taylor) - Previous research points to a disparity in the quality of memory traces resulting from an intention to remember and those formed despite an intention to forget. The aim of the current study was to determine whether the nature of memory traces for remember and forget instructed words differ on the dimensions of sound, appearance, and/or meaning. In three separate experiments, the study phase of a typical item-method directed forgetting paradigm was followed by a recognition memory test in which test words could either be identical to study words, new and unrelated (foils), or new and similar on a single but different dimension in each experiment (critical foils). An analysis of critical foil false alarm rates, so far, showed that while words are represented in memory in terms of their sound, appearance and meaning, only meaning is more likely to be encoded following an intention to remember. Email: Anjali Pandey, anjali.pandey@dal.ca

6:00-7:30 PM (1140)

RepeatedExposureDoesNotLeadtoPoorTraceDiscriminability.MENGTINGZHANGandALMUTHUPBACH, Lehigh University (Sponsored by Almut Hupbach)-Reaghand Yassa (2014) showed that repeated exposurestrengthenedrecognitionmemorybut alsoincreasedfalse

alarm rates to similar lures. This effect has been explained with the Competitive Trace Theory (CTT) which posits that repeated exposure creates different context traces which compete during retrieval, making it difficult to differentiate targets from similar lures. In this account, correct rejections are equated with good target memory and high discrimination ability. However, correct rejections can also reflect forgetting of the target. In our study, we directly compared memory strengths for targets and corresponding lures. We found that three exposures led to better detail memory and identified high forgetting rates of target memories as the reason for increased correct rejections after one exposure. This finding challenges the idea that repeated exposure leads to impaired trace discriminability. We conclude that the CTT should be tested with more variable contexts and over longer time scales.

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6:00-7:30 PM (1141)

An Investigation of the Effects of Dynamic Visual Noise on Concreteness and Levels of Processing. BENJAMIN AXEL ANDERSON and SCOTT PETERSON, Southwest Minnesota State University - Concreteness and levels of processing effects have been attributed to the differential availability of visual images for concrete words, and deeper levels of processing (LOP). Interestingly, the concreteness effect has been shown to disappear under conditions involving dynamic visual noise (DVN), which is thought to suppress the generation of visual images from long-term memory. The present study further investigated the role of visual imagery in the LOP and concreteness effects. Across four experiments, DVN was manipulated during study, and participants' memory for concrete and abstract words was measured using recognition or recall tests. LOP and concreteness effects were not fully explained by visual imagery because they were present under DVN conditions, suggesting a lack of support for a dualcoding explanation. The LOP and concreteness effects may be better explained by an "extended dual-coding theory", which incorporates the role of context availability in accounting for this pattern of results.

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6:00-7:30 PM (1142)

Interactions Between Effects of Emotional Expressions at Encoding and at Retrieval in Face Identification. CHARLES A. COLLIN, JUSTIN CHAMBERLAND, OLIVIER BROWN, DANY DAIGLE, and ISABELLE BOUTET, *University of Ottawa* – We examined the Emotion Enhancement of Memory (EEM) effect, which is the improvement of human recollection due to the emotional valence of stimuli, in a face recognition task. Previous studies in this area support a negativity effect among young adults, whereby they have a bias for attending to, and better recognizing, stimuli with negative valence. Few studies have explored whether such EEM effects are due to the impact of emotions at encoding, retrieval, or both. To examine this, we tested young adults on an old/new face recognition task wherein angry, happy, and neutral faces were presented at both learning and test. Gaze behaviours were measured throughout using an Eyelink 1000. There was no evidence EEM is driven by emotions shown at test. Rather, we observed a selective congruency effect, whereby faces shown in the same emotion at learning and test were better recognized, but (critically) not if they were neutral. This suggests that EEM effects arise due to an interaction between encoding and retrieval. Performance differences were not attributable to allocation of attention to regions containing information thought to be diagnostic for face recognition. Our results do not support a negativity bias in younger participants.

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6:00-7:30 PM (1143)

Subsetting Judgments in Recognition Memory: A Critical Test for General Threshold Models. SAMUEL WINIGER, University of Zurich, DAVID KELLEN, Syracuse University, HENRIK SINGMANN, University of Warwick, JEFFREY J. STARNS, University of Massachusetts, Amherst (Presented by Samuel Winiger) (Sponsored by Henrik Singmann) - An ongoing discussion in recognition-memory concerns the way memory representations are mapped to responses: Is there a direct mapping of graded memory representations (as assumed by signal detection theory), or are the responses mediated by discrete states (as assumed by threshold models)? We construct a General Threshold Model (GTM) which encompasses the one high-threshold model, the two high-threshold model, and variants of the low-threshold model as special cases. A new critical test provides evidence against the GTM, and therefore against the notion that recognition-memory is mediated by discrete states with the possibility of complete information loss. Email: Samuel Winiger, s.winiger@psychologie.uzh.ch

6:00-7:30 PM (1144)

Developing and Testing A Contextual theory of the Generation Effect. MATTHEW P. MCCURDY, University of Illinois at Chicago, ANDREA N. FRANKENSTEIN, ALLISON M. SKLENAR, PAULINE URBAN LEVY, and ERIC D. LESHIKAR, University of Illinois at Chicago (Sponsored by Audrey Duarte) - Prior work has shown that self-generating information often leads to better memory for that information than reading (i.e., the generation effect). The most widely supported theory of the generation effect suggests that generation improves memory over reading through two mechanisms: enhanced item-specific and relational processing (i.e., the multi-factor theory). However, the multi-factor theory cannot fully account for the range of outcomes in the vast generation effect literature. We propose a contextual theory of the generation effect that can flexibly account for the magnitude of the generation effect. This theory, based on the principles of contextualism, posits that the size of the generation effect is contingent on interactions between the generation task (the type of generation task used at encoding), memory test, materials, and subjects. We review data supporting the assumptions of this theory and discuss implications of a contextual theory for the generation effect.

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6:00-7:30 PM (1145)

Classifying Confidence Level Across Subjects Using Single-Trial EEG Analysis. KUEIDA LIAO, University of California, San Diego, MATTHEW V. MOLLISON and TIM CURRAN, University of Colorado, Boulder, VIRGINIA R. DE SA, University of California, San Diego - In this study, we trained single-trial leave-one-subject-out EEG classifiers to discriminate two different confidence levels in two memory retrieval tasks (item recognition with location/color source). The classifiers were trained separately on each of the datasets to give higher output for the high confidence responses. We showed that it is possible to predict subjects' confidence level responses with classifiers trained with data from other subjects. In order to distinguish confidence from familiarity, we also trained confidence classifiers of correct rejection responses only (Sure New vs Maybe New) where Sure New decisions represent more confidence and less familiarity than Maybe New decisions. Projections of the remember(R) and know(K) responses for trials with correct and incorrect source recollection conditions revealed that the projections of R responses consistently received higher (more like Sure New) scores than the projection of K responses in both correct and incorrect information recollection conditions. This suggests that the EEG responses distinguishing Sure New vs Maybe New decisions reflect confidence more strongly than familiarity.

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6:00-7:30 PM (1146)

Memory Suppression Is Modulated by Implied Exclusivity of Associations. OSCAR KOVACS and IRINA M. HARRIS, The University of Sydney (Sponsored by Sally Andrews) -Suppression is an adaptive mechanism, appearing to depend upon the prefrontal cortex (PFC), that affords us some control over access to stored memories. However, suppression can also lead to unwanted forgetting, such as in Retrieval-Induced Forgetting (RIF) paradigms. We used a series of modified RIF tasks to identify the factors that elicit this maladaptive suppression. We hypothesised that the typical structure of RIF learning trials creates an implication that associations are exclusive, and consequently triggers suppression when you are exposed to competing items. We tested three possible sources of this implied exclusivity: 1) a lack of co-occurrence between competing associates; 2) training on a structure that shows only one possible association at a time; and 3) the degree of overlap between contextual cues. Results indicate that having seen competing stimuli co-occur previously can attenuate memory suppression, giving insight into the nature of the representations that can be used to implement PFC-mediated memory control. Email: Oscar Kovacs, okov3082@uni.sydney.edu.au

6:00-7:30 PM (1147)

The Precision of Retrieving Temporal Information Associated with Episodic Memories. JOHN E. SCOFIELD and JEFFREY D. JOHNSON, *University of Missouri* – Time is a fundamental aspect of episodic memory, from providing context, maintaining ordered sequences, and allowing for general organization of the past and future. Studies have focused primarily on understanding these functions by assessing judgments of relative recency and the probabilities of remote versus recent retrieval success. Less is known however about the quality of the temporal information linked to memories, which we address here by measuring retrieval precision. Subjects studied a series of pictures (lasting about 18 minutes) while naive to the nature of the subsequent memory test. The pictures were then presented in random order at test, with the task being to place each precisely on the study timeline. After removing primacy and recency effects, a pattern emerged in which recency was associated to higher precision. The findings are discussed in terms of how continuous precision measures can inform our understanding of both memory quality and the representation of time.

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6:00-7:30 PM (1148)

The Source of List Strength Effect in Recall Memory. SHARON CHEN and AMY H. CRISS, Syracuse University - List strength effect (LSE) constrains memory models, and hence is of importance to study. The list strength paradigm asks whether strong memories affect other memories in the same list. Reliance on context or item information in the retrieval cue has been thought to be the source of LSE (Ratcliff, Clark and Shiffrin, 1990; Shiffrin, Ratcliff, & Clark, 1990). However, in a typical experimental design, cue type is confounded with the level of competition. A context cue is shared by all items and memories compete to get sampled, therefore the competition is high. An item cue is uniquely paired with another item and the competing memory set is narrow, producing a low level of competition. Therefore, in this project, we manipulated both cue type and the level of competition independently in a list strength paradigm. Data shows the direction and magnitude of LSE was determined by whether the cue is shared by all, half of, a quarter of the items, or one unique item. There was no effect of whether the cue is context or item. We discussed our results within the framework of the retrieving effectively from memory (REM) model.

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6:00-7:30 PM (1149)

The Animacy Advantage in Memory Might Stem from Non-Conscious Factors. MICHAEL J. SERRA and CARLEE M. DEYOUNG, Texas Tech University (Presented by Michael Serra) - People often recall more animate information (animals) than inanimate information (objects) in various memory tasks. Over 45% of people believe this effect occurs, another 45% believe animacy does not relate to memory, and 10% believe inanimate information is more memorable than animate information. Although most participants tend to demonstrate the animacy advantage in memory tasks (regardless of beliefs), the effect is sometimes largest for those who endorse the animacy advantage. In the present experiment, participants self-paced their study of a list containing both animate and inanimate words before completing free recall. Participants demonstrated the animacy advantage, and the effect was largest for those participants who endorsed beliefs consistent with that effect. However, there were no differences in study time by animacy

or by belief. These results suggest that both the animacy effect and its interaction with beliefs might stem from non-conscious factors not captured by measures such as self-paced study time. Email: Michael J. Serra, michael.serra@ttu.edu

6:00-7:30 PM (1150)

Are Supernatural Concepts a Cognitive Epiphenomenon? JOSEPH SOMMER, PERNILLE HEMMER, and JULIEN MUSOLINO, Rutgers University (Sponsored by Pernille Hemmer) - The literature on the cognitive science of religion posits that supernatural concepts (e.g., gods, ghosts, spirits) are memorable because they are minimally counterintuitive (MCI)-i.e., they contain characteristics that violate intuitive expectations. Similarly, the von Restorff effect (VR) describes a pattern of enhanced memorability for outlier items in a homogenous list. We investigate whether the MCI and VR effects are behavioral manifestations of the same underlying cognitive processes. To permit a meaningful comparison of the two effects, we developed a novel set of stimuli to guard against a number of existing confounds. We objectively measured a number of relevant parameters by obtaining ratings from a large M-Turk sample. We normed for several theoretical constructs, including unusualness, agency, and thought provokingness to directly compare memorability for MCI and VR items. Here we report results from an experiment where participants read and later recalled narratives with MCI, VR, and intuitive items embedded.

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6:00-7:30 PM (1151)

Mind Map Structural Quality Predicts Retention of Factual Information. HAOTONG WANG and KAYLA HRUDKA, University of Saskatchewan, JENNIFER L. BRIERE and TAMMY A. MARCHE, Saint Thomas More College, University of Saskatchewan (Sponsored by Tammy Marche) - Effective learning strategies can increase recall and improve academic performance. The mind map (MM) learning strategy integrates numerous memory-aiding components (e.g., colours, pictures, examples, hierarchies, associations) and promotes recall of factual information. Structural quality of MMs has been assessed using the Mind Map Assessment Rubric (MMAR) and is based on the amount of colours, pictures, concept-links, cross-links, hierarchies, and examples incorporated within a MM. The purpose was to determine whether MMAR scores were predictive of the amount of factual information recalled. In small groups, 56 participants (Ps) viewed a 15 min slide presentation on the MM technique and then had 20 min to create a MM based on information presented in a 670-word article. After a 2 min delay, Ps completed a 15-item short answer quiz regarding the article. MMs were graded by 3 examiners using the MMAR. Correlational analyses revealed high interrater reliability, and a statistically significant positive correlation between MMAR scores and retention scores. This research has implications regarding how students should structure MMs to improve retention of factual information.

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6:00-7:30 PM (1152)

A Memory Advantage for Prosocial Behaviors. PAULINE URBAN LEVY, University of Illinois at Chicago, ERIC D. LESHIKAR, University of Illinois at Chicago (Sponsored by Laura Matzen) - Prior work in memory has shown that some types of information related to social targets show an advantage in memory, such as cheating behaviors. This study examines a possible memory advantage for another type of social information, prosocial behaviors. Like cheating behaviors, prosocial behaviors may be especially useful to know about a target and therefore may have a memory advantage. When shown social targets paired with behaviors, participants were able to recall behaviors of social targets significantly more often when those behaviors were prosocial rather than neutral. This study shows evidence for a possible memory advantage for prosocial behaviors and provides insight into how memories of social behaviors are stored and recalled.

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6:00-7:30 PM (1153)

Core Memory Processes in Choice Behavior. ADA AKA and SUDEEP BHATIA, University of Pennsylvania (Sponsored by Sudeep Bhatia) - How do people use memory to make decisions? More specifically, does remembering items in a purerecall task activate the same memory processes as retrieving items from memory to make a decision? We systematically analyze the memory mechanisms at play in choice behavior using a list learning paradigm, a prominent experimental method used in the episodic memory literature. In two preregistered studies, we demonstrate that certain memory regularities, such as the primacy effect and semantic and temporal clustering, persist in memory-based decision making, though they are diminished relative to pure-recall. In contrast, desirability and past frequency of consumption play a stronger role in guiding retrieval in decision tasks than in pure-recall tasks. Computational models fit to participant data provide converging support for our results.

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6:00-7:30 PM (1154)

The Recall of Highly Literal Phrases Is Both Incremental and Redintegrative. CASSANDRA L. JACOBS and FERNANDA FERREIRA, University of California, Davis - Language production is sensitive to higher-order linguistic statistics like phrase frequency (Janssen & Barber, 2012; Shao et al., 2019), posing a puzzle for incremental models of language production. Free recall tasks provide a window into the retrieval mechanisms in phrase production. Jacobs, Dell, and Bannard (2017) found that participants recalled both words, rather than just one, from more frequent adjective-noun phrases (e.g. "alcoholic beverages"). However, adjective-noun phrases must be conceptually combined to be interpreted, so their conclusions about phrase production mechanisms may be limited. We therefore conducted two free recall experiments containing highly literal binomial expressions (e.g. "coat and tie") that were embedded in triplets of simple line drawings. We found that the more frequent a binomial expression, the more participants recalled both words, showing that even the

production of highly literal phrases is supported by linguistic statistics, and that the previous results cannot be explained entirely by conceptual combination.

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6:00-7:30 PM (1155)

Haven't I Heard This Before? The Mechanism and Bias of Déjà Entendu. KATHERINE L. MCNEELY-WHITE (Graduate Travel Award Recipient) and ANNE M. CLEARY, Colorado State University (Sponsored by Carol Seger) - Research shows that deja vu experiences can be elicited when spatial relations from study are embedded within otherwise novel test scenes. Additionally, deja vu has been linked with illusory feelings of prediction, whereby participants erroneously believe they can predict an event's outcome. The present study examined an unexplored subtype of deja vu - deja entendu - the feeling of having heard something before. We examined the hypothesis that, as with visual stimuli, its likelihood will increase with high feature overlap, and that it will be associated with illusory feelings of prediction. We embedded familiarized musical features into novel song sequences. Indeed, participants were more likely to report deja entendu for songs containing familiarized features, and reports of deja entendu were associated with illusory feelings of predicting songs' contour, and also sounds' locations. These findings extend existing research on the mechanisms and biases of deja vu experiences to the auditory realm.

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6:00-7:30 PM (1156)

Using Virtual Reality to Study Human Foraging Behavior. NOAH CHICOINE, ANDREAS K. WILKE, MEGAN PORGA, BELISENA HALL, SARAH MORAN, KATELYNN MAYS, SCHUYLER MEYER, and ALEX LEE, Clarkson University (Presented by Noah Chicoine) (Sponsored by Andreas Wilke) -Our previous research suggests that the hot hand phenomenon, a tendency to perceive illusory streaks of clumps in sequences and grids, is a human universal tied to humans' evolutionary history of foraging. In past experiments, we showed that the hot hand phenomenon helps to explain the difficulty people have in reasoning about randomness in situations like gambling and games of hide and seek. In this new study, we examine the behavior and decision strategies made by humans in actual simulated foraging scenarios. By letting participants search for food resources in a Virtual Reality environment, we will gain insight into how people decide where to search and when they give up searching at a local site. Recorded time and movement data will capture search patterns in specific statistical distributions as well as what changes in search strategies occur when participants respond to the presence and absence of resources.

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6:00-7:30 PM (1157)

Bayesian Integration of Visual Landmark Cues During Navigation. PHILLIP M. NEWMAN (Graduate Travel Award Recipient) and TIMOTHY P. MCNAMARA, *Vanderbilt University* (Sponsored by Timothy McNamara) – Successful navigation depends on the utilization of spatial cues, such as visual landmarks and sensorimotor information. Previous work has demonstrated that human navigators can optimally integrate spatial cues of different sensory types according to Bayesian principles. The current study investigated how human navigators combine spatial cues of the same sensory type, namely visual landmark cues. Two hypotheses were tested. The Independent Representations Hypothesis predicts that navigators represent spatial locations with respect to individual landmark vectors. The Configural Representations Hypothesis predicts that, in addition individual landmark vectors, navigators also integrate landmark configuration cues, leading to superadditive benefits to performance beyond the combination of individual landmark vectors. In immersive virtual reality, participants learned the location of a target in the presence of a square-like configuration of landmarks, and then attempted to return to that location in the presence of all or a subset of the landmarks. Response variability was reduced when the entire configuration was available and was consistent with an optimal integration model, supporting the Independent Representations Hypothesis.

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6:00-7:30 PM (1158)

Investigating the Flexibility of Visuospatial Memory Using Pupillometry. ALEXANDRE MAROIS, FLORENCE DUHAIME, CINDY CHAMBERLAND, FRANCOIS VACHON, and SÉBASTIEN TREMBLAY, Université Laval - Retention of visuospatial information underpins numerous complex everyday tasks. Despite its importance, visuospatial memory has been less investigated than its verbal counterpart and the question as to whether its capacity is fixed or flexible remains unanswered. The current study aimed at exploring whether mental effort-indexed by the pupil size-differs or remains constant depending on the number of spatial locations to memorize. Thirty participants were asked to reconstruct the order of a sequence of 4, 7, or 10 dots presented in different locations on a computer monitor. Unsurprisingly, longer lists were associated with poorer performance. Yet, analysis of the tonic pupil response showed that while the pupil size enlarged as a function of serial position in 4- and 7-dot trials, it plateaued after 3-4 items in 10-dot trials. Such findings suggest that visuospatial memory capacity varies according to the number of to-be-remembered items, supporting a flexible, dynamic view of this type of memory.

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6:00-7:30 PM (1159)

Global Spatial Updating from Across-Boundary Navigation. WEIMIN MOU and XUEHUI LEI, *University of Alberta* (Presented by Weimin Mou) (Sponsored by Weimin Mou) – Previous studies examining mental perspective taking in a remote space showed a sensorimotor effect (i.e., better performance if imagined and physical perspectives are aligned), which can be based on local maps (e.g., using similar geometry). However, no global sensorimotor effect was shown even after participants walked to the testing room adjacent to the learning room. The current study investigated whether the null global sensorimotor effect was attributed to the acrossboundary navigation. In Experiment 1, in an immersive virtual environment, participants learned objects and walked to a new position in the same/ another room (within/ across-room condition) without vision. Participants then adopted imagined perspectives and pointed to targets. The imagined perspectives were globally aligned or misaligned with their physical perspectives. The results showed a global sensorimotor effect that was comparable in within and across-room conditions. The global sensorimotor effect in the across-room condition was replicated in Experiments 2 and 3. These results suggest that people can update global sensorimotor representations from across-boundary navigation.

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6:00-7:30 PM (1160)

Asymmetrical Influence of Visual Gain Changes on Spatial Representations During Navigation. YU DU, ARNE D. EKSTROM, and MICHAEL JAMES STARRETT, University of Arizona - Recent work suggests that changes in virtualreality that do not conform to physical reality (e.g., wormholes) can induce spatial representations that violate (Euclidean) geometrical principles. Previous research indicates that humans can quickly adapt to a visual gain change and such a gain change can influence their spatial representations, yet whether such gain changes also result in representations that violate Euclidean geometry remains untested. Participants searched for objects in different hallways, one of which involved the visual walking distance equal to the visual gain times the physical walking distance., while half of the participants received a gain of 0.7 (slow group) and the other half received a gain of 1.3 (fast group). Participants then pointed to the positions of objects from the center of the environment. For the slow group, the pointing angle between the objects in the gain-changed hallway was significantly larger than that in the normal-gain hallway while the fast group did not show any influence of the new gain. These results suggest that gain decreases can produce novel "warpings" of spatial representations.

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6:00-7:30 PM (1161)

Individual Differences in Integrating Spatial Relationships Across Successively Viewed Regions. MERVE TANSAN, THOMAS F. SHIPLEY, and NORA S. NEWCOMBE, Temple University (Sponsored by Thomas Shipley) - Encoding spatial environments for flexible navigation often requires integration across separately-experienced regions. Such integration is facilitated by active movement around the sub-spaces (Holmes, Newcombe & Shipley, 2018). But can people integrate when inference across multiple views is required? Here, using the Holmes et al. paradigm, participants sequentially viewed four rooms in a tabletop dollhouse model. However, they did not directly experience the spatial relationship between the first and last rooms (the holdout pair). Overall, pointing errors for holdout and non-holdout pairs did not differ, indicating integration, but individual variability was high. We therefore split the sample by level of performance on non-holdout pairs. Pointing errors were higher for holdout pairs for poor performers, but holdout and non-holdout did not differ for better performers. These results highlight the importance of individual differences in representations that underlie navigation processes. Email: Merve Tansan, merve.tansan@temple.edu

6:00-7:30 PM (1162)

Cue Combination of Path Integration and Piloting in Goal Directed Navigation. YAFEI QI, XUEHUI LEI, and WEIMIN MOU, University of Alberta (Sponsored by Weimin Mou) - Our previous study has shown that the Bayesian cue combination of piloting and path integration occurs in estimating the navigator's self-localization prior to homing. The current study investigated whether the cue combination occurs in estimating self-localization prior to estimating locations of goals including the home. In an immersive virtual environment, participants learned the locations of three goals in the presence of distal landmarks, then walked a two-leg path without seeing landmarks or goals. After walking participants replaced goals to the original locations in four conditions, path integration only, landmarks only, both cues, and conflict cues. The ratio of the length between the testing position (P) and turning point (T) over the length between T and three goals (G) was 0.5, 1 or 2. Across experiments, different goal locations were used as the home location. The results showed the Bayesian cue combination for heading estimations in all leg ratios and for estimating the direction of the goal only in the leg ratio of 0.5. These results extended our previous finding to goal localizations and indicated that participants combined cues to estimate their self-localization prior to calculate the goals' locations. Email: Yafei Qi, yyqi@ualberta.ca

6:00-7:30 PM (1163)

Group Dynamics Predict Collective Navigation Success in Urban Environments. TAD BRUNYE, Tufts University & U.S. Army, DALIT HENDEL, Tufts University, AARON L. GARDONY, Tufts University & U.S. Army, HOLLY A. TAYLOR, Tufts University - Wayfinding successfully through complex environments involves a continuous interplay between environmental features, trait individual differences, and unfolding cognitive processes. While extant research has largely examined how these factors shape individual navigation, relatively few studies have examined how individual- and grouplevel factors may shape collective navigation toward common goals. In the present study, participant triads collaboratively studied a map and then navigated together through a large-scale urban environment while maintaining access to a single map. We assessed initial and ongoing collaborative map behavior, collective navigation performance, and emergent team leadership, and assessed how these behaviors were predicted by individual differences in spatial and non-spatial traits. We found interactive effects of non-spatial and spatial traits over time, with leadership and spatial traits differentially predicting emergent group leadership and team navigation efficiency. The present results shed new light onto existing models of human wayfinding, extending them to group performance and highlighting the importance of interpersonal traits and interactions in predicting navigation success. Email: Tad Brunye, tbruny01@tufts.edu

6:00-7:30 PM (1164)

Uncertainty Triggers Information Seeking, but What Information? ASHLYNN M. KELLER, Tufts University, TAD T. BRUNYE, U.S. Army NSRDEC, GEORGE L. WOLFORD II, Dartmouth University, HOLLY A. TAYLOR, Tufts University (Sponsored by George Wolford II) - Navigating an unfamiliar city produces uncertainty about how to get from place to place. This uncertainty, in turn, triggers information gathering. While navigational uncertainty is common, the type of information people seek when uncertain is unclear. Environmental information includes landmarks, landmark configurations, and geometric information. Uncertainty could lead individuals to more likely seek a particular information type. We explored spatial information seeking using a classic spatial learning task (spatial reorientation), which intentionally induces uncertainty through disorientation and cue conflict. However, unlike the classic task, we measured continuous behavior (orientation and path), rather than only the final choice. Continuous measures should better reveal the cognition-action loop in spatial learning and decision making. Experiment 1 replicated the standard spatial reorientation task, providing baseline continuous measures linked to final navigational decisions. Follow-up experiments manipulated both landmark and geometric environment information. Our continuous measures provide insights into spatial learning and decision making. Email: Ashlynn M. Keller, ashlynn.keller@tufts.edu

6:00-7:30 PM (1165)

Absolute Direction Feedback Impacts Environmental Knowledge. CHRISTOPHER DUDAS-THOMAS, PIERS ECHOLS-JONES, and WILLIAM MESSNER, Tufts University, AARON L. GARDONY, Center for Applied Brain & Cognitive Sciences, HOLLY A. TAYLOR, Tufts University (Sponsored by Holly Taylor) - People frequently use navigational aids to reach their destination. Navigational aids can alter the way we understand and interact with the world. Though they improve navigational efficiency, some types actually impair spatial memory (e.g., Gardony et al., 2015). However, recent research shows that providing consistent absolute direction information (e.g. north) can improve orientational knowledge (Weisberg et al., 2018). In the current research, we presented absolute direction information either via a wearable vibrotactile device or through verbal feedback. Both groups improved cardinal direction pointing. Specifically, prior to training, participants align cardinal direction estimates with their internal cardinal directional understanding, and training improves these estimates by aligning them with true cardinal directions. Training also improves building pointing estimates, but specifically only for buildings that incidentally lie north of participants. We discuss these findings in relation to environment features and consider their generalizability. Our results suggest absolute direction feedback may mitigate spatial memory costs associated with traditional navigational aids.

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6:00-7:30 PM (1166)

The Impact of Facial Affect on Race Judgment. DEAN G. PURCELL and LEENA TWAL, Oakland University, ALAN L. STEWART, Stevens Institute of Technology - Our observers judged if two briefly presented pictures of faces, one following the other, represented the same race. Both pictures were either angry or happy and while unrelated to the observer's judgment of race, affect could influence that judgment. In this sense our experiment was similar to Stroop's experiments on color naming. African-American and Caucasian male and female faces were used. Miller, Maner and Becker (2010) found that judgment of the race of male African-American faces was fastest when a face's expression represented anger. They concluded that an angry male face facilitates an observer's identification of that face as African-American, an example of an anger-superiority effect (ASE). Ford and Purcell (2012) did not replicate Miller et al., finding instead that angry expressions delayed race judgments for Caucasian as well as African-American male faces. For our observers the presentation of angry faces delayed the race judgment, without regard for the pictures gender or race. This finding adds additional support to the hypothesis that angry faces slow responses and may disrupt behavior (Purcell et al.,2010).

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6:00-7:30 PM (1167)

The Effect of Negative Self-Concept and Depressive Symptoms on Negative Attentional Bias. YUKI NISHIGUCHI, University of Tokyo - Individuals with depression have negatively biased cognition, which is assumed to be caused by connection between negative concept and self-concept. However, no previous studies have empirically examined the relationship between the strength of negative self-concept and the magnitude of negative cognitive bias. If cognitive bias is produced by negative self-concept, the strength of connectivity between negative concept and self-concept and the magnitude of cognitive bias should positively correlate. In the present study, we developed the Japanese version of depression implicit association test (IAT), which is the measure of the connectivity between negative concepts and self-concept. We also examined the validity of the depression IAT, investigating the correlation between the scores in depression IAT, negative attentional bias, and depressive symptoms.

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6:00-7:30 PM (1168)

Stimulus Devaluation Is a Consequence of Cognitive Inhibition, Not a Mere Reflection of Conflict: Evidence from Task-Switching. ELIZABETH MARIE CLANCY (Graduate Travel Award Recipient) and MARK JAMES FENSKE, *University of Guelph* (Sponsored by Mark Fenske) – Stimuli that are ignored or from which a motor-response is withheld subsequently receive more negative affective ratings than prior targets of attention/response. Leading accounts posit that this stimulus devaluation effect reflects negative affect elicited by inhibition when applied to resolve conflict produced by distracting or otherwise-inappropriate stimulus/response representations. Another line of research, however, suggests that stimulus/response conflict may itself elicit negative affect, raising questions about whether stimulus devaluation effects previously attributed to cognitive inhibition may actually reflect the affective consequences of conflict, *per se.* To address this, we measured ratings of stimuli (art-like patterns in Exp. 1-2, faces in Exp. 3) that had just appeared on key trials of a taskswitching paradigm (ABA vs. CBA task sequences) known for its capacity to distinguish behavioural effects of inhibition and conflict. Across all three experiments, the conditions showing behavioural evidence of backward inhibition also resulted in the most negative ratings of associated stimuli. These findings suggest that cognitive inhibition leads to stimulus devaluation above and beyond any impact of conflict.

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6:00-7:30 PM (1169)

Effects of Social Anxiety on Attentional Control for Social and Non-Social Stimuli. KENTA ISHIKAWA, TAKATO OYAMA, and MATIA OKUBO, Senshu University - The present study investigated the effect of social anxiety on attentional control for social and non-social stimuli. Considering the characteristics of social anxiety, we expect that the level of social anxiety predicts the deficiency of attentional control for social stimuli more than for non-social stimuli. Thirty-eight participants conducted a spatial Stroop task, in which arrow and gaze stimuli were presented as target. Participants were asked to indicate the direction of the target (indicating left or right), irrespective of the location of the target (left or right). Inconsistent with our expectation, social anxiety scores moderately correlated with the spatial Stroop effects when the arrow stimuli were presented but not when the gaze stimuli were presented. These results imply the deficiency of attention control for non-social stimuli neither than for social stimuli among socially anxious people. Email: Kenta Ishikawa, cognition.psy.k@gmail.com

6:00-7:30 PM (1170)

Mind Wander Now, Feel Better Soon? Mind Wandering Is Used as a Mood Repair Strategy by Skilled Emotion Regulators in an Ambulatory Assessment Study. LENA STEINDORF and JAN RUMMEL, Heidelberg University, ANDREAS B. NEUBAUER, DIPF, C. DENNIS BOYWITT, Universität Mannheim (Sponsored by Jan Rummel) - Killingsworth and Gilbert (2010) noted that "a wandering mind is an unhappy mind", suggesting that off-task thoughts lead to negative emotional consequences in everyday life. Taking a look at individual differences, we conducted an ambulatory assessment study, in which we tested whether mind wandering can also have positive effects on mood. Participants completed an emotion-regulation questionnaire (among others) and installed a smartphone application on their private phones, which was set to collect data for seven consecutive days. Six times a day, participants were asked to

report on their current mood, their current activity, and whether they had been mind-wandering or not. Results of a multi-level analysis (N = 88) showed that mind wandering was generally associated with negative mood, replicating previous studies' results. Additionally, current mood was generally positively predicted by previous mood, whether participants were mind wandering or not. However, participants classified as good emotion regulators showed the opposite pattern when mind wandering. This finding qualifies Killingsworth and Gilbert's notion by suggesting that certain individuals are able to use mind-wandering episodes to counter-regulate their emotions.

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6:00-7:30 PM (1171)

No Stability in Valence Effects on Emotion-Cognition Interactions. ANJALI THAPAR, Bryn Mawr College - Research in social cognition and cognitive aging has shown that younger adults show a negativity bias such that negative words and pictures are remembered better than positive or neutral ones. In contrast, older adults show a positivity bias such that positive words and pictures are better remembered than negative or neutral ones. Support for age differences in emotion-cognition interactions has been reported across multiple cognitive domains (e.g., memory, attention, and perception). However, researchers typically focus on a singular task in one cognitive domain. The present study sought to address this gap in the literature by investigating younger and older adults' cognitive valence biases, factors that might be used as predictors of such biases, and the stability of these biases across cognitive domains. Results revealed no significant age differences in the bias patterns for valenced material (positive and negative). Furthermore, none of the proposed predictor variables were consistently correlated with participants' bias for positive or negative material, and task bias scores (positive or negative) were not stable within or across the cognitive domains. Email: Anjali Thapar, athapar@brynmawr.edu

6:00-7:30 PM (1172)

Is It the Story or the Face? Effects of Gender Stereotypes on Perception of Emotional Expression. LESLIE A. VALDES and REGINA KLAGES, *Saint Cloud State University* – Plant et al. (2000, 2004) found that participants' ratings of faces with ambiguous emotional expressions were consistent with gender stereotypes. This study examined if participants would perceive a face, that was a composite of a man and woman's face, differently if they first read a description of the target person in an emotional situation. Participants read 8 vignettes of fictional characters identified with gendered pronouns and a first name and then judged the emotional expression of a genderneutral face. Four stories described a situation that would elicit happiness and the rest described a situation that would elicit anger. Half of the stories matched the facial expression of either happy or angry. The remaining stories were paired with either neutral or scared expressions. Overall participants rated faces as more emotional if the target was described as a woman than a man. Contrary to expectations, the ratings of the angry face did not differ by gender. However, participants seemed to ignore the vignette for male targets when the story and picture did not match. Implications for emotional gender stereotypes are discussed.

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6:00-7:30 PM (1173)

Parents, Nurses, and Undergraduate's Difficulty Recognizing Facial Expressions of Pain in Children. VICTORIA FOGLIA, McMaster University, ANNIE ROY-CHARLAND and RENÉ-PIERRE SONIER, Université de Moncton, MÉLANIE PERRON, Laurentian University (Presented by Victoria Foglia) - Individuals have difficulty distinguishing genuine, suppressed, and fake pain in children. Experiment one examined parents' and nurses' ability to recognize pain in children while their eye-movements were tracked. No differences were observed between caregiver groups for accuracy, which was around 50%. Participants were more accurate for suppressed than genuine pain and more for genuine than fake expressions. Eyetracking results provide insight for improvement. Experiment 2 explored whether emotional intelligence and emotional contagion were predictors of assessing pain in undergraduate students. University students correctly recognized children's pain similarly to parents, and nurses. Regressions showed no relation between emotion abilities and the assessment of children's pain. Conditional analysis of response bias revealed that though suppressed pain had a higher proportion of correct response, participants answered suppressed falsely as often as correctly. Both experiments indicate difficulty recognizing pain in children. Difficulty may be associated with a suppressed pain detection response bias.

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6:00-7:30 PM (1174)

Loneliness and Cognition: Inconclusive Evidence from a Young Adult Sample. ALISON J. DAY and KIMBERLY M. FENN, Michigan State University (Sponsored by Kimberly Fenn) - In the elderly population, loneliness is associated with cognitive deficits, including poorer performance on working memory and long-term memory tasks. However, it is unknown how loneliness relates to cognition in the loneliest age range - young adults. To elucidate these relationships, we recruited college-aged adults for a two-session study over the course of two days. We assessed loneliness, depression, long-term memory, working memory, and emotion recognition. Greater loneliness related to poorer working memory performance, and ability to recognize emotional faces but there was no relationship between loneliness and long-term memory. However, we were unable to separate the effects of loneliness from depression, and the results were not replicated in a follow-up study. These inconsistent results suggest that young adults may not suffer from poorer cognition due to loneliness. Instead, the negative relationships between loneliness and cognition may develop over time.

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6:00-7:30 PM (1175)

Emotional Content Modifies Semantic Expectations During Analogical Reasoning: An ERP Study. YANICK LEBLANC-SIROIS and ISABELLE BLANCHETTE, Université du Québec à Trois-Rivières - Analogical reasoning is often used in everyday life, including in emotionally charged situations. However, the effect of emotions on analogical reasoning remains unclear. For the first time, we investigated whether and how emotions affect analogical reasoning using the N400 component, an evoked response potential (ERP) that indexes semantic processing. Sixteen participants evaluated 256 four-term analogies (A is to B; as C is to D). The first two terms were presented simultaneously. Then, the third and fourth terms were presented serially. Participants decided whether they thought each analogy was valid. Emotional value (negative/neutral) was manipulated at the first pair of terms and at the third term. We also manipulated analogy strength (weak/strong). We recorded ERPs evoked by the last term. Weak analogies yielded a smaller N400 component, suggesting that the 4th term was more surprising for weak analogies. This effect was stronger when the third term was neutral rather than negative. Emotional value only affected N400 amplitude during the evaluation of weak, not strong analogies. Our results suggest that emotional content increased the perceived soundness of weak analogies, possibly by activating a wider semantic network.

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6:00-7:30 PM (1176)

Emotional Disclosure in Children: Improving Well-Being Through Expressive Writing in French 5th Graders. MICHAEL FARTOUKH, Université Côte d'Azur - CNRS -Research with adults indicates that writing about stressful and negative experiences is related to psychological well-being and to significant benefits (psychological and physical health). The few studies in children led to mixed results. The present study explored the possible benefits of an expressive writing intervention in children on psychological well-being (anxiety and depression). To test the effects of written emotional disclosure, forty-six 5th graders were assigned to one of three conditions (two expressive writing conditions and one neutral). Children in all groups were requested to write during 20 minutes four times on four weeks. In parallel, standardized measures of anxiety and depression were assessed before, one week after and two months after the writing sessions. Results showed significant effect of the writing condition on anxiety and depression measures. For the anxiety, the two expressive writing conditions led to a decrease of the symptoms, just after the writing sessions for the negative condition and two months after for the positive condition. Conversely, for the depression, there was only a significant effect for the negative expressive writing condition with a decrease just after the writing sessions. Email: Michael Fartoukh, michael.fartoukh@univ-cotedazur.fr

6:00-7:30 PM (1177)

Investigating Emotion-Label and Emotion-Laden Words in a Semantic Satiation Paradigm. RYAN HILDEBRANDT and TINA M. SUTTON, Rochester Institute of Technology - Current literature suggests that emotion-label words (e.g., sad) and emotion-laden words (e.g., funeral) are processed differently. The central focus of the present study was to investigate how valence and emotion word type influence word processing. The current study used a satiation paradigm to characterize the relationship between the processing of emotion-label and emotion-laden words of positive and negative valence. It was hypothesized that, in addition to the standard slowed response times to satiated words, emotion-label words would exhibit greater satiation and priming effects than emotion-laden words. Analyses indicated the slowed processing of satiated words as compared to primed words, as well as a difference in overall reaction times between word types, with positive emotion-label words eliciting the fastest times, positive emotion-laden words being significantly slower, and neutral words being the slowest. Analyses also indicated a significant interaction between satiation condition and match/mismatch trial, specifically between primed mismatch trials and satiated mismatch trials. The current study may serve to fill gaps in our understanding of how emotional information is communicated and handled in word processing.

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6:00-7:30 PM (1178)

Hearts out of Sync - Cross-Linguistic & Gender Differences in Basic Emotion Term Evaluation. HALSZKA KINGA BAK, Adam Mickiewicz University, JEANETTE ALTARRIBA, University at Albany, SUNY - In this study we analyzed how verbal labels denoting basic emotions (sadness, joy, anger, fear, disgust, surprise) are conceptualized in terms of valence, arousal, and dominance across English and Polish languages. Words denoting basic emotions in both languages and all their synonyms were collected from lexicographic sources (1764 items for English, 577 for Polish). Samples of native English and Polish speakers were invited to evaluate the words using the Self-Assessment Manikin. We found that Polish speakers evaluate all emotion terms as more negative and harder to control than English speakers. We also found that across both languages, women evaluate all the emotions conventionally seen as negative (sadness, anger, fear, disgust) as more negative and joy as more positive than men. Women also evaluate all emotions as more subjectively intense. The perception of basic emotion concepts as coded in language appears to be partially subject to relativistic and socio-cultural factors. Email: Halszka Kinga Bak, hbak@wa.amu.edu.pl

6:00-7:30 PM (1179)

Recognizing Emotions from Discourse and Prosody: When Literal Meaning and Intonation Differ. A. REYYAN BILGE and BÜŞRA TELLI, *Istanbul Sehir University* – Emotional content of a conversation is recognized through its literal meaning and intonation of speech. In this study we investigated whether comprehension of emotional discourse is affected when prosody conflicts with the literal meaning. Alexithymia, a condition where people have difficulty recognizing emotions, has been shown to affect comprehension of emotional discourse. To control for it, undergraduates from Istanbul Schir University were first pre-screened with Toronto Alexithymia Scale (TAS). Sixty-two students (29 Alexithymia; 33 no- Alexithymia) were exposed to emotion-based discourse (i.e., happy, sad, angry, surprised). Each discourse had literal meaning of the emotion (e.g., happy), presented in both congruent (e.g., happy) and incongruent (e.g., sad) prosody. When literal meaning and prosody were incongruent, participants responded less accurately and more slowly. Separate analyses on emotions showed a more pronounced difference between congruent (e.g., happy-happy) and incongruent (e.g., happy-sad) pairs, especially for people with Alexithymia.

Email: A. Reyyan Bilge, reyyanbilge@sehir.edu.tr

Poster Session II Friday Noon Room 517 B Viewing 11:00 AM-1:30 PM, Author Present 12:00-1:30 PM

POSTER SESSION II

12:00-1:30 PM (2001)

Episodic Memory in a Transgenic Rat Model of Alzheimer's Disease. JONATHON D. CRYSTAL and DANIELLE PANOZ-BROWN, Indiana University (Presented by Jonathon Crystal) - Alzheimer's disease (AD) is characterized by profound impairments in episodic memory, the memory system that stores unique personal experiences. The TgF344-AD transgenic (Tg) rat model of AD manifests progressive increases in neuropathology and age-dependent deficits in spatial learning and memory. It is unknown if Tg rats (1) have intact episodic memory function at timepoints prior to development of latestage neuropathology and (2) exhibit age-dependent episodic memory loss. Here we characterize episodic memory function using our olfactory based item-in-context approach in young Tg and wildtype (WT) rats. Young Tg and WT rats remember multiple unique events in context using episodic memory. When the memory of item in context was put in conflict with non-episodic familiarity cues, young Tg and WT rats relied on episodic memory. Our findings suggest that episodic memory is intact in young Tg and WT rats and support the hypothesis that intact episodic memory function precedes cognitive decline. Email: Jonathon D. Crystal, jcrystal@indiana.edu

12:00-1:30 PM (2002)

Instructed Matching Strategies: Learning Symbols to Guide Decision Making. MAISY BOWDEN, BROOKE N. JACKSON, BARBARA A. CHURCH, and J. DAVID SMITH, Georgia State University (Sponsored by Barbara A. Church) - One foundation of human cognition is the ability to symbolically represent objects, constructs, and ideas. Humans use language for this purpose. Though nonhuman primates lack language, they might also be able to learn the abstract meaning of symbols that can guide their information processing. To evaluate this possibility, we examined children's (ages 3-5) and monkeys' ability to learn symbols that would instruct their matching rules. We taught them visual icons representing the required matching strategy (match by color; match by shape) in a matching-to-sample task. The matching tasks progressively increased in difficulty, with participants required to match by color or shape depending on the symbolic-icon instruction they received. Both children and monkeys clearly take strategy instructions from these abstract symbols. Future research will examine whether these symbols can also be used to declare after the fact the matching strategy that the participant chose to adopt.

Email: Maisy Bowden, mbowden4@student.gsu.edu

12:00-1:30 PM (2003)

Exploring the Sociality of the Archerfish. ORIT NAFCHA (Graduate Travel Award Recipient), SIMONE SHAMAY-TSOORY, and SHAI GABAY, *University of Haifa* (Sponsored by Ruth Kimchi) – Humans and fish are both vertebrates,

but they separated 450 million years ago; hence any pattern of similar behavior in such distinct species might suggest that such behavior has adaptive value for survival. We here examine whether fish present pro-social behavior. We chose the Archerfish to be our model since we could exploit their natural ability to shoot down insects by training them to shoot at targets presented on computer screens. We explored whether fish could make social choices – choosing either a target rewarding only the acting fish or a second target rewarding both the acting fish and a neighboring fish. We found that fish favored the social targets. Interestingly, when there was no fish on the other side of the partition there was no preference in the acting fish's selections. The fish's tendency to choose the social target may suggest an evolutionary origin to many social processes in humans.

Email: Orit Nafcha, ornafcha@gmail.com

12:00-1:30 PM (2004)

Language Discrimination in the Domestic Dog (Canis Familiaris). AMRITHA MALLIKARJUN, EMILY SHROADS, and ROCHELLE S. NEWMAN, University of Maryland, College Park (Sponsored by Jared Novick) - At 5 months, infants distinguish between languages based on rhythm, but fail to distinguish unfamiliar languages in the same rhythm class. However, when one of the languages is their native language, they succeed, indicating that familiarity with native language phonology aids infants' discrimination (Nazzi, Jusczyk, & Johnson, 2000). It is unclear whether mammals in general can distinguish between languages using phonological cues, and if this varies based on language familiarity. Here, we examine how regular linguistic exposure in the domestic dog shapes the ability to use rhythmic and phonological cues to distinguish languages. Dogs listened to stories recorded in Spanish and English. We find that dogs hearing only English at home listen longer to Spanish stories, while preliminary results show dogs hearing Spanish at home listen longer to English stories. This indicates dogs can discriminate languages differing in rhythm. We plan to test English-hearing dogs on English-German discrimination. If dogs distinguish between English and German, which are in the same rhythm class, it suggests that regular exposure to language, even without a human linguistic system, leads to more precise language discrimination. Email: Amritha Mallikarjun, amritham@umd.edu

12:00-1:30 PM (2005)

Effects of Cs Foods and Poison-Induced Neophobia on Food Aversion Conditioning in Japanese Fire-Bellied Newts. TOHRU TANIUCHI, *Kanazawa University* – The present study examined food aversion conditioning in Japanese fire-bellied newts. Newts were allowed to eat pieces of 40 mg kamaboko (a Japanese cuisine: steamed mixture of pureed white fish and additives) as CS food for 60 min. and then received either an i.p. injection of lithium chloride (LiCl) solution or a saline solution. In a test conducted one week after the conditioning, most of the newts who received LiCl showed emesis of CS food within 24 h and lesser CS consumption than the control newts. Experiment 2 showed that the conditioned aversion was selective to CS food and that decrease in consumption of CS food could not be attributed only to enhanced neophobia (e.g., Domjan, 1975) caused by administration of LiCl. Experiment 3 confirmed reliable development of food aversion conditioning not only for kamaboko CS but also for pieces of 40 mg beef and mealworms used in the previous study which reported absence of food aversion conditioning in toads and newts. Contradictory to earlier findings that showed absence of food aversion conditioning in amphibians but not in reptiles (e.g., Paradis & Cabanac, 2004), the present findings provide clear evidence of food aversion conditioning in amphibians. Email: Tohru Taniuchi, tohruta@staff.kanazawa-u.ac.jp

12:00-1:30 PM (2006)

Did I Launch That?: Seeking Attributions of Self-Agency in Monkeys. BROOKE N. JACKSON, MARKIE N. ADAMCYZK, BARBARA A. CHURCH, and J. DAVID SMITH, Georgia State University - Self-agency is an important component of humans' self-awareness (e.g. Metcalfe & Green, 2007). Comparative researchers are interested in whether nonhuman primates feel agency but examining self-agency in species lacking language is difficult (e.g., Couchman, 2012). Therefore, we developed a measure of self-agency that does not require verbal instructions or report. Through trial and error, participants learned to discriminate two classes of events based on whether their action controls a rocket launch. In human participants, those who were able to discover that self-agency divided the categories reached high accuracy levels and shared a distinct error pattern. We then tested four rhesus macaques to see if they would perform similarly. Results suggest monkeys do not easily use their agency to divide the categories. The results have implications for the evolutionary emergence in the primates of the capacity for attributing self-agency.

Email: Brooke N. Jackson, bjackson55@student.gsu.edu

12:00-1:30 PM (2007)

Attentional After Effects of Gaze and Peripheral Cues: Inhibition of Return or Facilitation of Return? TAKATO OYAMA, KENTA ISHIKAWA, and MATIA OKUBO, *Senshu University* (Sponsored by Matia Okubo) – Gaze direction triggers reflexive attentional shifts. Gaze cues do not usually produce inhibition of return, except for very limited conditions (Frischen et al., 2007). Human gaze direction generally corresponds to biologically and socially important information. Therefore, if the attention is disengaged from the gazed-at location, we hypothesized the attention produced by gaze cues returns to the cued location (facilitation of return). To test this hypothesis, we used gaze and peripheral cues in a cueing paradigm and examined the attentional after-effects of these cues. Inhibition of return was observed for peripheral cues while facilitation of return was observed for gaze cues. These results do not support previous findings of Frischen et al. (2007). Inhibition of return may not easily occur by gaze cues because gaze direction conveys socially important information. Email: Takato Oyama, toyama@psy.senshu-u.ac.jp

12:00-1:30 PM (2008)

Spatial Cueing Effects Are Not What We Thought: A Priority Accumulation Model of Attentional Capture. DOMINIQUE LAMY, Tel Aviv University - Attention models distinguish between a preattentive stage, during which each object's overall priority level is computed, and a second stage, during which attention is deployed to the highest-priority location. However, little research has investigated what triggers the attentive stage. Here, we present experiments from three spatial-cuing paradigms measuring manual and eye-movement responses, that address this issue and support the Priority Accumulation Model (PAM). According to PAM, (1) several factors determine an object's priority: its own salience and relevance, but also the salience and relevance of recent events at its location; (2) each competing object's priority level accumulates across time; (3) the larger the winner's leading edge is, the faster competition is resolved; (4) crucially, the selection of the winning object does not occur until the context that signals the relevant search moment arrives. Our model and findings resolve current inconsistencies in the literature, namely by showing that spatial cueing effects do not necessarily index attentional shifts. Email: Dominique Lamy, domi@tauex.tau.ac.il

12:00-1:30 PM (2009)

The Use of an Auditory Multi-Feature Paradigm for the Study of Attention Capture in Younger and Older Adults. FAROOQ KAMAL, CASSANDRA MORRISON, KENNETH CAMPBELL, and VANESSA TALER, University of Ottawa (Sponsored by Erin Maloney) - The involuntary switch of attentional orientation has been identified as a cognitive process that may decline with age. To better understand this process, electrophysiological markers (deviant-related negativity; DRN, and P3a) can be measured while participants are presented with auditory sounds. In this study, younger adults (aged 18-30) and older adults (aged 65+) were presented with to-be-ignored auditory stimuli consisting of a frequently presented standard and six rarely presented deviants (increment, decrement, frequency, duration, white noise, and environmental sound deviants). We found that older adults exhibited reduced DRN amplitudes to only the frequency and duration deviants. Additionally, P3a amplitude was significantly reduced in older adults following both the novel environmental sounds and white noise deviants. A reduced P3a in older adults likely reflects impaired frontal lobe functioning which leads to declines in attentional orientation.

Email: Farooq Kamal, fkama074@uottawa.ca

12:00-1:30 PM (2010)

Is Meaning Really Extracted Automatically? Evidence from Attentional Capture by Categorical Auditory Deviants. FRANÇOIS VACHON, HUGO FITZBACK-FORTIN, LYSANDRE PROVOST, and KATHERINE LABONTÉ, *Université Laval*, JOHN E. MARSH, *University of Central* Lancashire - Automatic processes are deemed to take place independently of task set and top-down cognitive control. For a long time, semantic processing has been assumed to be fully automatic. Yet, more recent evidence indicates that it can be susceptible to higher level cognitive influences. The present study revisited this debate by testing the automatic access to the meaning of irrelevant auditory stimuli through the assessment of their distractive power. We highlighted a novel auditory distraction phenomenon whereby a change of category within an irrelevant stream of spoken items disrupted an unrelated visual serial recall task. This categorical deviation effect was non-contingent on the current task set (Experiment 1) and was resistant to top-down control manipulations (Experiment 2). By suggesting that the semantic content of the irrelevant sound can be extracted independently from activated goals and in an uncontrollable fashion, these findings shed new light on the automatic nature of semantic processing.

Email: François Vachon, francois.vachon@psy.ulaval.ca

12:00-1:30 PM (2011)

Selective Attention and the Sequential Organization of Speech. MARK A. PITT and MARJORIE FREGGENS, The Ohio State University (Presented by Mark Pitt) - Speech perception requires the integration of disparate acoustic signals (fricatives, vowels) over time into an auditory object whose parts cohere despite potential intrusions from simultaneous sounds. We investigated how two processes, auditory grouping and selective attention, operate to preserve cohesion. Stimuli were [s]-initial words (e.g., spin) in which the [s] was presented to one ear and the remainder of the word to the other. We manipulated the strength of grouping cues competing for ownership of [s] within and across ears. Listeners were instructed to report only what was heard in the attended ear. Although acoustic cues dominated in determining the percept reported by participants, large individual differences in performance were found that are suggestive of selective attention. Implications for the perceptual organization of speech will be discussed.

Email: Marjorie Freggens, freggens.1@buckeyemail.osu.edu

12:00-1:30 PM (2012)

The Effect of Distractor Saliency on Attentional Capture. DONGYU GONG and PEI SUN, Tsinghua University -Theeuwes (1991) found that a salient but task-irrelevant color singleton would increase the response time to the target form singleton, and he proposed that this was because the salient distractor captured attention before it was shifted to the target, which is known as the automatic capture hypothesis. The present study examined whether the level of the distractor saliency has an effect on attentional capture using a modified additional singleton paradigm. Specifically, visual stimuli with five levels of distractor saliency defined on the color and size dimensions were presented in two studies respectively. Using a with-subject design, we collected the response time for each participant in different distractor saliency conditions. The results revealed a significant influence of different levels of distractor saliency on response time in both studies and suggested that a certain threshold existed for distractor saliency to elicit attentional capture. Our findings showed high inter-observer reliability

and high within-observer test-retest reliability, demonstrating that the effect of distractor saliency on attentional capture is consistent across people and stable within individuals. Email: Pei Sun, peisun@tsinghua.edu.cn

12:00-1:30 PM (2013)

Attentional Template Specificity Is Modulated by Task Demands for Single and Multiple Control Settings. RYAN S. WILLIAMS, SUSANNE FERBER, and JAY PRATT, University of Toronto (Sponsored by Jay Pratt) - It has been shown that individuals can maintain multiple attentional control settings simultaneously when targets can be identified by coarse grain representations. It is unclear, however, whether or not multiple attentional control settings can also be maintained when finegrained template representations are required to distinguish targets from distractors. To examine this, we employed a contingent capture task that used a single target-defining color (Experiment 1) or two target-defining colors (Experiment 2). Critically, the visual similarity of targets and distractors was varied between participants in both experiments to manipulate the required specificity of target representations. For both experiments, attention was reliably captured by uninformative precues from the broad target color category when targets and distractors were visually dissimilar, while attention was selectively captured by target-colored precues when targets and distractors were visually similar. Overall, these results indicate that multiple target features can be maintained simultaneously regardless of the level of template specificity required to identify a target from distractors.

Email: Ryan S. Williams, ryanscott.williams@mail.utoronto.ca

12:00-1:30 PM (2014)

Does Individual Working Memory Capacity Predict Susceptibility to Attention Capture by Distractors? RISHI PUROHIT, HANNAH KENNEDY, and MEI-CHING LIEN, Oregon State University, ERIC RUTHRUFF, University of New Mexico - Previous studies have shown that individuals with low visual working memory (VWM) capacity are much more susceptible to distraction than high VWM individuals. Recently, Lien, Ruthruff and Naylor (2014) reported that frequently switching between search strategies weakened the attentional set, leaving spatial attention more vulnerable to capture by irrelevant objects. The present study examined whether there are individual differences underlying capture by assessing VWM capacity. Methods were similar to Lien et al., except that we measured individual working memory capacity using a change detection task. We observed that the low VWM individuals were no more susceptible to being captured by distractors than were high VWM individuals. Overall, the present study suggests that VWM may not be the primary determinant of attention capture, contrary to some previous studies.

Email: Mei-Ching Lien, Mei.lien@oregonstate.edu

12:00-1:30 PM (2015)

Spatial Attentional Control Settings Influence Unconscious Cueing of Attention. SEEMA PRASAD and RAMESH MISHRA, University of Hyderabad (Sponsored by Ramesh



Mishra) - Is it possible to ignore irrelevant objects in our environment, even when we are not consciously aware of them? In two experiments, we examined whether spatial attentional control settings (ACS) generated by task-goals modulate unconscious cueing of attention. On each trial, a coloured circle at the centre indicated the task-goals for that trial (eg., blue (green) circle - look at one of the two target-circles in the upper (lower) visual field). Before the response, an unconscious cue was displayed for 16 ms followed by a display with variable SOA (16, 33, 50, 100 ms). The unconscious cues on any given trial could be presented either in the relevant or the irrelevant visual field. As expected, unconscious cues at relevant locations biased the frequency and latency of saccades. Importantly, the saccade latencies on trials with irrelevant cue vs. no cue were comparable suggesting that unconscious cues at spatially irrelevant locations were ignored and failed to capture attention. The results were replicated when the participants were asked to saccade to one of the two target-circles in the left/right visual field. These findings provide additional evidence for top-down control over unconscious attention.

Email: Seema Prasad, gp.seema@gmail.com

12:00-1:30 PM (2016)

Guidance of Attention from Visual Working Memory Is Not Strongly Object Based. DANIEL D. THAYER, BRETT BAHLE, and ANDREW HOLLINGWORTH, University of Iowa (Sponsored by Andrew Hollingworth) - Attention is guided by template representations in visual working memory (VWM). Here, we examined the structural units of this mechanism, testing whether object-based structure in VWM encoding/maintenance generalizes to attentional guidance. Participants remembered two color-shape conjunction objects. During a retention-interval search task, a distractor could match either the color and shape from a single remembered object (same-object condition) or the color from one object and the shape from the other (different-objects condition). Substantial attention capture by memory-matching distractors was observed, but the magnitude of capture did not differ reliably between the same-object and different-objects conditions. Specifically, capture effects on overall reaction time (Experiment 1) and on the probability of distractor fixation (Experiment 2) were substantially more likely to occur under a model that did not include an effect of same/different object(s). The results indicate that the representational units of guidance from VWM are individual features rather than bound objects. Email: Daniel D. Thayer, danielthayer1@gmail.com

12:00-1:30 PM (2017)

The Relationship Between Attentional Control Settings and the Spatial Gradient of Attention. NICOLE G. PLANTIER and SHAUN P. VECERA, *University of Iowa* (Sponsored by Shaun Vecera) – Although initial evidence indicated featurebased attention operated in a spatially global manner, more recent findings support a spatial gradient within feature-based attention (Leonard, Balestreri, & Luck, 2015, JEP:HPP). In the current research, we asked about the relationship between attentional control settings and the spatial profile of attention. Specifically, is the spatial gradient of attention independent of attentional control settings, or is the gradient altered by those settings, with a steeper spatial gradient associated with more selective attentional control settings? Using an RSVP task to assay attention's spatial profile, participants adopted either a singleton search mode or a feature search mode, and feature search could be either trial unique or set experiment wide. Despite the differences in attentional selectivity elicited by these control settings, we demonstrated similar spatial profiles for each control setting. This result suggests attentional control settings operate independently of spatial attention. Email: Nicole G. Plantier, Nicole-plantier@uiowa.edu

12:00-1:30 PM (2018)

Testing Perceptual Load Theory with an Adapted Attentional Blink Task. ISABELLA LIM and JAY PRATT, University of Toronto - Perceptual load theory states that whether or not flanking distractors capture attention depends on if the perceptual task is easy (capture) or difficult (no capture). Evidence supporting this theory is primarily drawn from visual search tasks, raising the necessity to examine whether load effects can also be found in tasks that do not involve visual search. To accomplish this, an attentional blink (AB) paradigm was adapted to measure reaction times (RTs). In Experiment 1, participants were required to pay attention to two targets (T1 and T2), where T2 was presented after T1 at varying positions (lags) in a rapid serial visual presentation stream. T2's position relative to T1 should serve as a proxy for perceptual load, with high load being at short lags and low load being at a long lag. Confirming this, an RT-based AB effect was found with slower reaction times to T2 at the short lags. To then test perceptual load theory with this task, congruent or incongruent flankers were introduced beside T2 in Experiment 2. The RT-based AB effect occurred again, but no flanker compatibility effect was found. These results suggest that perceptual load effects may be most amenable to visual search tasks.

Email: Jay Pratt, pratt@psych.utoronto.ca

12:00-1:30 PM (2019)

Overt Social Attention Is Differentially Affected by Differences in Stimulus Content Information. EFFIE J. PEREIRA, McGill University, ELINA BIRMINGHAM, Simon Fraser University, JELENA RISTIC, McGill University (Sponsored by Jelena Ristic) - Humans spontaneously attend to social cues like faces and eyes. However, recent findings show that this behavior is weakened when stimulus content and visual context are controlled. Here, we investigated attentional biasing elicited in response to various stimulus content information. Using a dot-probe task, participants were presented with a face-house cue pair, followed by a target that could occur at the previous location of the eyes or mouth of the face, top or bottom of the house, or at one of two neutral locations. Importantly, the face as compared to the house either had a different configuration of internal features (Experiment 1), greater luminance (Experiment 2), or higher subjective attractiveness (Experiment 3). Manual reaction times to the target revealed no evidence of covert attentional biasing towards social cues. Overt attention biasing, measured by tracking eye movements during the cue period, provided no evidence of preferential biasing towards faces or eyes in the configuration or luminance conditions; however, an overt bias towards the eyes emerged for attractive faces. Together, these findings suggest that overt biasing towards social cues is differentially affected by the type of stimulus content presented.

Email: Effie J. Pereira, effie.pereira@mail.mcgill.ca

12:00-1:30 PM (2020)

Emotional Stimuli Will Capture Attention. ARIEL M. KERSHNER, University of Iowa, KATHERINE S. MOORE, Arcadia University (Sponsored by Katherine Moore) - Each day, the attentional filter helps us to suppress distractions and find the targets we are looking for by enhancing relevant information, however, this allows our attention to be captured by related irrelevant information, a phenomenon called contingent attentional capture. When participants search for more than one target concurrently, target identification suffers further when irrelevant information related to one target impedes detection of the other target, a phenomenon called set-specific capture. We investigated if both attentional capture effects are modulated by one's current mood state (positive, negative) or by the valence of the target (positive, negative) in a RSVP stream. Six trial types measured accuracy, three assessing attentional capture at lag 2 or lag 4 and three controlling for random responding. Results suggest that attentional capture was driven by the valence of the target. Negative targets were immune to both capture effects while positive targets followed the expected capture patterns.

Email: Ariel M. Kershner, ariel-kershner@uiowa.edu

12:00-1:30 PM (2021)

Assessing Introspective Awareness of Attention Capture. OWEN ADAMS and NICHOLAS GASPELIN, Binghamton University, SUNY (Sponsored by Nicholas Gaspelin) -Researchers have long debated whether physically salient stimuli have an automatic power to capture visual attention. As a consequence, many interesting questions about attentional capture remain unanswered. In the current study, we directly tested whether participants had introspective awareness of whether or not they were captured. Participants performed an additional singleton paradigm, where they searched for a pop-out target shape and attempted to ignore a salient color singleton. On a subset of trials, participants classified whether the color singleton captured their attention during search ("capture" vs. "no capture"). We compared behavioral performance on "capture" and "no capture" trials, finding evidence that participants were slower to detect the target on "capture" trials than "no capture" trials. Follow-up experiments revealed enhanced processing at the singleton location on "capture" trials. Altogether, these results indicate that observers have immediate awareness of attentional capture, even in instances where they do not overtly move their eyes. Email: Owen Adams, oadams2@binghamton.edu

12:00-1:30 PM (2022)

Examining the Domain Generality of Cognitive Flexibility. JULIANNE KEY and ANTHONY W. SALI, *Wake Forest University* – Individuals adjust their readiness to shift spatial attention or switch tasks-a phenomenon known as cognitive flexibility-according to the demands of their environment (Dreisbach & Haider, 2006; Sali, Anderson, & Yantis, 2015). However, the domain-specificity of cognitive flexibility and resulting implications for distractibility remain unknown. In the current study, participants searched for the unique shape in an array and used one of two task rules to characterize the enclosed stimulus. We manipulated the frequency with which they switched between rules across blocks of trials. On half of the trials, a salient color distractor was also present in the search array. As in previous studies, behavioral task-switching costs were smallest when switching was most likely. Although the additional color singleton captured attention, there was no change in the magnitude of this capture based on task-switching likelihood, providing evidence that changes in task-switching flexibility are not associated with changes in distractibility. Email: Anthony W. Sali, saliaw@wfu.edu

12:00-1:30 PM (2023)

Attentional Suppression Based on Statistical Learning. HA EUN CHOI and YANG SEOK CHO, Korea University (Sponsored by Jacqueline Shin) - Two experiments, each of which consisted of search and probe trials, were conducted to examine whether automatically produced bottom-up signals can be suppressed via cognitive control processes. In Experiment 1, participants were to search for the target defined by color while ignoring a distractor color singleton on search trials and the target defined by shape regardless of colors on probe trials. Responses were fastest to the probe inked in the target color of the search trials and slowest to the probe inked in the distractor color of the search trials on probe trials. To examine whether attentional suppression based on statistical learning occurs, a color was adopted to associate with distractors on search trials in Experiment 2. On probe trials, responses were slower to the probe inked in the distractor-associated color than a neutral color. These findings suggest that salient but statistically taskirrelevant features were learned to suppress. Email: Ha Eun Choi, che5101@naver.com

12:00-1:30 PM (2024)

Visual Attention Is Captured by Controllable Objects. GREG HUFFMAN and JAMES R. BROCKMOLE, University of Notre Dame - While the factors that contribute to individuals feeling a sense agency over a stimulus have been subject to much study, the cognitive effects of having a sense of agency over a stimulus are little known. We examined whether stimuli that are under a person's control capture attention. A set of circles moved around a display. The motion of one circle was controlled by participants via arrow keys on a keyboard. A target appeared on one of the circles and participants pressed a button when they detected its appearance. In four experiments, we manipulated the degree of control participants had over the stimuli, the probability the controlled stimulus could contain the target, and whether control was cued or voluntarily determined. In all cases, targets were detected more quickly when they appeared on stimuli under participant control, suggesting that a sense



of agency over an object led that object to capture attention. Collectively, these results indicate that a sense of agency over an object causes visual attention to be biased towards that object. Email: Greg Huffman, ghuffman@nd.edu

12:00-1:30 PM (2025)

Effects of Selection History on the Size Congruity Effect in Visual Search. TAYLOR DAGUE, KEN SOBEL, CAROLINE DACUS, and AMRITA PURI, University of Central Arkansas (Sponsored by Amrita Puri) – The size congruity effect (SCE) occurs when observers localize the numerically (or physically) larger (or smaller) digit during number comparison or visual search. Reaction times (RTs) are faster when targets' physical and numerical size are congruent (both large or both small) vs. incongruent (e.g., physically large 2 among physically small 8s and 9s), even when observers are instructed to search based on physical size and could ignore numerical size. Here, we investigated whether selection history affects the SCE in visual search. When observers searched for numerical size, the SCE was present regardless of whether the physical size (irrelevant feature) of the current target matched that of the previous target. In contrast, when searching for physical size, the SCE only occurred when the numerical size (irrelevant feature) of the current target matched that of the previous target, suggesting that priming of numerical value drives the SCE during search for physical size.

Email: Taylor Dague, tddague@gmail.com

12:00-1:30 PM (2026)

Age Similarities in Onset Detection Despite Bias for Detecting Offsets. MARIA J. DONALDSON-MISENER, Cleveland State University & John Carroll University, ERIC S. ALLARD, Cleveland State University - Past research on change detection suggests that new visual events capture attention more efficiently than the deletion of previously viewed events, a phenomenon known as onset primacy. The present study evaluated the attentional rigidity hypothesis and attentional priority hypothesis in a younger and older adult sample to determine how onset primacy unfolds in the adult lifespan. Participants were randomly assigned to one of four conditions: a neutral condition and three conditions designed to induce bias for detecting offsets. Results largely support onset primacy; onsets were detected significantly faster (M = 583.69, SD = 123.05) than offsets (M = 648.79, SD = 117.10), F(1, 56) =44.699, p < .001. Condition did not influence reaction time, F(3,56) = 1.425, *p* = .245, or accuracy, *F*(3, 56) = 1.009, *p* = .870, and there was no evidence of age effects for accuracy. These results provide some support for onset primacy and the attentional rigidity hypothesis but do not rule out the attentional priority hypothesis. Perhaps the task, paradigm or stimuli did not sufficiently induce offset bias. Future work should pursue other means of inducing offset primacy to determine how attentional prioritization unfolds across the adult lifespan.

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12:00-1:30 PM (2027)

Openness to Experience in Processing Narrative: Measuring Readers' and Viewers' Narrative Absorption as a Function of Personality. CATALINA IRICINSCHI and ZOE DARAZSDI, The University of the Arts - Narrative processing research focuses almost exclusively on the nature of the stimulus (i.e., narrative event) and consistently overlooks the nature of the participant. The hypothesis currently investigated in this study correlates the participants' personality dimension of openness to experience with the perceived narrative absorption and the memory for narrative events. An inarguable feature of openness to experience is its correlation to absorption and immersiveness (McRae & Costa 1997). More intense emotional experiences capture the high end of the openness to experience spectrum (Eldesouky 2012; Glisky et al. 1991). Participants are presented with literary and film vignettes rated as high/ low in narrative engagement. Narrative absorption self-reports and questionnaire scores for openness to experience measure the correlation between readers' and viewers' openness to experience and their perceived narrative absorption. Eye tracking will provide implicit measurements (i.e., pupil dilation, gaze duration) for the participants' narrative absorption and cognitive load. Recall and recognition tests for narrative events will further test whether openness to experience applies to narrative counterfactual thinking.

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12:00-1:30 PM (2028)

Motivated Suppression of the Value- and Threat-Modulated Attentional Capture. LAURENT GRÉGOIRE, MARK K. BRITTON, and BRIAN A. ANDERSON Q, Texas A&M University - Attention prioritizes stimuli previously associated with reward or punishment. Here, we examined whether this attentional bias could be suppressed with sufficient motivation. Participants performed a training phase which involved fixating a shape-defined target. One color-singleton distractor predicted the possibility of receiving a reward and another an electric shock, each of which occurred with 33% probability. Participants could earn a reward or avert punishment for fast and accurate performance when the respective color distractor was presented, thus providing strong motivation to resist distraction by these stimuli. Results revealed a reduction in the magnitude of attentional capture by reward- and threatrelated distractors, relative to neutral distractors, that persisted into extinction. In a second experiment, we replicated the suppression of value-modulated attentional capture with the shock condition removed, thus confirming that the suppression did not result from the presence of threat. When sufficiently motivated, signals for reward and threat can be actively suppressed.

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12:00-1:30 PM (2029)

Effects of Exposure and Encoding History on Oculomotor Capture by Faces. GRETA N. MINOR, ALLISON E. NICKEL, and DEBORAH E. HANNULA, *University of Wisconsin-Milwaukee* – Past work indicates that faces capture attention more often than other objects. Here, we examined whether the strength or persistence of capture is influenced by experience with search and/or encoding history. In two experiments, participants completed a simple visual search task, attempting to make a single saccade to a uniquely colored circle. Objects (e.g., faces, houses) were also present in search displays but were taskirrelevant. In Experiment 1, capture effects were examined as a function of time on task and in Experiment 2, after establishing baseline levels of capture, participants encoded faces and houses before repeating the search task. Results suggested that faces are less likely to capture attention with more task exposure, that faces capture attention disproportionately regardless of encoding history, and that even after encoding, capture by houses does not increase. This pattern of results is consistent with claims that faces are a special class of object information. Email: Deborah E. Hannula, hannula@uwm.edu

12:00-1:30 PM (2030)

Perceptual Stability in Real-World Scenes. DEBORAH A. CRONIN and JOHN M. HENDERSON, University of California, Davis - With each eye movement, the visual information stream is disrupted and objects rapidly change position on the retina. The visual system adeptly compensates for these disruptions, creating a stable perception of the visual world across saccades. This stability persists even when stimuli move during saccades: detection and discrimination performance for transsaccadic stimulus displacements is low (e.g., Mack, 1970). In experiments using simple stimuli, performance improves drastically when the stimuli briefly disappear at the conclusion of the saccade (e.g., Deubel et al., 1994). The present study examined whether a blank screen at the conclusion of a saccade similarly improves displacement detection in real-world scenes. In contrast with previous work, a blank screen did not improve performance and, under some circumstances, significantly impaired displacement sensitivity. These results speak to the mechanisms underlying perceptual stability in real-world scenes and the extent to which effects found with simple stimuli scale up to more complex, naturalistic stimuli.

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12:00-1:30 PM (2031)

The Role of Statistical Regularities in the Adaptation of Learned Contextual Cues. ARTYOM ZINCHENKO and MARKUS CONCI, Ludwig-Maximilian University, THOMAS TÖLLNER, Ludwing-Maximilian University, HERMANN J. MÜLLER and THOMAS GEYER, Ludwig-Maximilian University - Visual search becomes more efficient if the target item is consistently encountered within a stable spatial arrangement of distractor - context - items. However, changes of the target location in a nevertheless constant distractor array completely abolish this context-cueing effect. Here we show that adaptation to a new target location within already learned distractor layouts is facilitated when these displays are presented within longer streaks of trials, thus establishing a stable environment of sequences of repeated displays. We co-registered search reaction times (RTs) and ERPs and found that the recovery of RT facilitation by repeated contexts after target position changes was accompanied by improvements in the two lateralized ERP waveforms: N1pc and N2PC, reflecting early, preattentive, detection of the target in a repeated sensory array (N1pc) and the selection of, or allocation of attention to, the target item in an array of non-target items (N2pc). These findings suggest that statistical target-context memory also represents information about the distribution or reliability of statistical signals. This second-order knowledge, in turn, has great implications for the efficiency of the statistical learning process itself.

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12:00-1:30 PM (2032)

Understanding the Impact of Fascination on Attention Restoration and Creative Problem Solving. BROOKE University of Colorado, Denver, CHARBONNEAU, ALEXANDRE MAROIS, Université Laval, CHAD MOFFITT, University of Utah, ANDREW SZOLOSI, Ohio University, JASON M. WATSON, University of Colorado, Denver -Continuously directing attention toward the environment is effortful. However, Attention Restoration Theory (ART) suggests nature can have a beneficial impact on attention by eliciting fascination. Nature settings that are high in mystery are especially preferred and effective at eliciting fascination because they are inherently interesting. The present study used a combined normative-intervention approach to investigate potential mechanisms underlying attention restoration and its benefits. In Experiment 1, normative data indicated highmystery nature scenes were more fascinating, liked, and were associated with fewer task-unrelated thoughts than lowmystery scenes. In Experiment 2, other participants were presented with the high- or low-mystery nature scenes as primes in a quasi-intervention prior to completing a Remote Associates Test. Results indicated participants solved creative reasoning problems (COTTAGE, SWISS, CAKE=CHEESE) more quickly and were less likely to abandon the task when primed by high-mystery scenes. Taken together, these results are generally consistent with ART, revealing high-mystery nature is fascinating and engaging, apparently capturing attention to promote its restoration and to improve creativity.

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12:00-1:30 PM (2033)

Statistical Regularities Influence Suppression in Auditory Selective Attention. HEATHER R. DALY and MARK A. PITT, The Ohio State University (Sponsored by Mark Pitt) - Definitions of selective attention tend to reference two components: a facilitatory mechanism that enhances the attended signal, and an inhibitory mechanism that suppresses irrelevant signals. These mechanisms have been studied extensively in vision, but less is known about their operation in audition. The present investigation tested whether suppression in auditory selective attention is sensitive to statistical regularities in complex scenes, which was shown in recent work in vision (Wang & Theeuwes, 2018). Participants listened to scenes consisting of several voices saying series of digits and a distracting environmental sound. There were two distracting sounds, one of which occurred more frequently (70%) than the other (30%) across trials. One voice on each trial was a gender singleton, and participants were asked to report whether it was saying even or odd numbers. RTs were faster when the high-probability distractor was in the scene relative to when the low-probability distractor was present, suggesting that participants used the frequency of the distractor across trials to aid performance. This result demonstrates that suppression mitigates the detrimental influence of a frequently occurring distracting sound.

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12:00-1:30 PM (2034)

Investigating Temporal Capabilities of the Standard Saliency Model. LIYA MERZON and GEORGIY ZHULIKOV, NRU Higher School of Economics, TATIANA MALEVICH, Werner Reichardt Centre for Integrative Neuroscience, SOFIA KRASOVSKAYA and JOSEPH MACINNES, NRU Higher School of Economics (Sponsored by Joseph MacInnes) - The Saliency model (Itti & Koch, 2000) has maintained popularity for its biological plausibility and focus on attentional theory. The model's performance in predicting the spatial locus of attention has been well studied (Itti & Koch, 2000; Itti & Borji, 2013; see also MIT saliency benchmark), however, the temporal dynamics of the attentional shift has been neglected, despite the temporal aspects of the leaky integrate-and-fire (LIF) layer. The study tested the model's implementation by Walther & Koch (2006) against human data (from Gordienko, 2016). The model predictions of the initial fixation durations didn't match the ground truth with the default parameters of the model. We optimized the LIF parameters with a genetic algorithm and Nelder-Mead method, using a combination of z-test and kstest statistics as the fitness function. No tested combination of parameters yielded a match to human temporal data. Further investigation showed that LIF relies on variability of input images and is not able to produce enough variability of initial fixation duration within an image.

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12:00-1:30 PM (2035)

The Effect of the Antisaccade Task on Microsaccade Suppression in the Posner Cueing Paradigm. SOFIA KRASOVSKAYA, NRU Higher School of Economics, ARNI KRISTJANSSON, University of Iceland, JOSEPH W. MACINNES, NRU Higher School of Economics (Sponsored by Jeremy Wolfe) - The functional purpose of microsaccades is still debated. Spatial cueing paradigms typically require fixational control, but not all oculomotor activity associated with the preparation of saccades in the cued direction is eliminated. During the antisaccade task observers are asked to make saccades in the opposite direction to the onset of a cue. Planning and execution are therefore separate processes. We thus hypothesise that microsaccades will be reduced during the execution of antisaccade as compared to prosaccade trials. Twenty-two participants were asked to perform saccades or antisaccades in blocked or mixed trials. They participated in three blocks: a fixed saccade block, a fixed antisaccade block, and a mixed saccade - antisaccade block. The results of the study show a large latency cost for antisaccades and an additional cost of mixed blocks. In the blocked antisaccade trials fewer microsaccades were made. We believe this may be due to participants having enough time to prepare the top-down control of the oculomotor system. We predict that in the mixed block participants have less time to prepare the top-down microsaccade suppression and test this by comparing data between the saccade, the antisaccade and mixed blocks. Email: Sofia Krasovskaya, krasov.sofia@gmail.com

12:00-1:30 PM (2036)

Color-Me Matched: Temporal Migration of Visual Components. HARRISON ADLER and HELENE INTRAUB, University of Delaware (Sponsored by Helene Intraub) - Scene identification is excellent at presentation speeds of around 100 ms; much faster than the eyes can move. Nevertheless, pictures and frames presented simultaneously during rapid serial visual presentation (RSVP) are sometimes perceived sequentially (temporal migration: Intraub, 1985). Color similarity was investigated as a factor that may facilitate integration of these components at fast presentation speeds, reducing temporal migration. Twelve pictures were presented at 100 ms each in an RSVP sequence. One of these was surrounded by a rectangular frame, and participants were tasked with identifying it. The frame was either color matched to the picture (matched trials), or not (mismatched trials). Hit rates were significantly higher on matched than mismatched trials, indicating a color matching effect benefiting integration. Slower (83 ms) and faster (117 ms) presentation speeds showed that this effect was stronger at longer presentations, suggesting color matching influences integration relatively late in perceptual processing. Email: Harrison Adler, hadler@psych.udel.edu

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12:00-1:30 PM (2037)

Tracking the Time Course of Saliency- and Meaning-Based Scene Processing Using Representational Similarity Analysis. JOHN E. KIAT and STEVEN J. LUCK, University of California, Davis - Attention may be attracted by both low- and high-level visual features in natural scenes. Here we utilized EEG/ERPs and representational similarity analysis (RSA) to examine the time course of the neural representation of low-level Graph-Based Visual Saliency and high-level meaning-based representations. Participants viewed a series of 50 different scenes, continually maintaining the most recent scene in memory. For each pair of scenes, we computed the correlation between the spatial distribution of low-level salience, the correlation between the spatial distribution of higher-level meaningfulness ("meaning maps"), and the correlation between the ERP scalp distributions. This procedure gave us separate 50x50 matrices representing inter-scene similarity in terms of saliency, meaning, and neural activity. We then assessed how well the ERP similarity matrix could be predicted by the similarity matrices for saliency and meaning. We found robust, largely independent, relationships between the ERP, visual saliency, and meaning-related representational spaces that evolved dynamically over time. Email: John E. Kiat, jekiat@ucdavis.edu

12:00-1:30 PM (2038)

Color Imagery Modulates the N2Pc Component in Color Singleton Search. BRETT A. COCHRANE, *University of Toronto*, BEN TOWNSEND, JOEY K. LEGERE, RYAN C. LEE, BRUCE MILLIKEN, and JUDITH M. SHEDDEN, McMaster University (Sponsored by Bruce Milliken) - The N2pc component is an event-related potential waveform that reflects enhanced attentional selectivity in visual search. To date, it is unclear whether the amplitude of the N2pc can reflect efficient allocation of attention driven by top-down processes. Recent behavioral studies have demonstrated that color imagery overrides automatic inter-trial priming effects commonly associated with the N2pc. The goal here was evaluate whether color imagery could independently modulate the N2pc amplitudes. Participants performed a visual search task where they responded to the oddball colored target among homogenously colored distractors. Prior to each experimental trial, participants were cued to imagine a color that either matched or mismatch the upcoming target. We found that when color imagery matched the target a significant N2pc amplitude was present, and that the N2pc was absent when color imagery mismatched. Further, the magnitude of the N2pc amplitude increased with the frequency that participants reported implementing the color imagery instruction. This finding provides compelling evidence that that top-down imagery strategies can influence attentional selectivity as measured by the N2pc component.

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12:00-1:30 PM (2039)

Experience with Difficult Dual-Color Search Can Promote a Shift to a Single Range Target Representation. JUNHA CHANG (Graduate Travel Award Recipient), University of Massachusetts, Amherst, LENA STONE and KYLE R. CAVE, University of Massachusetts, Amherst (Sponsored by Kyle Cave) - Recent studies suggest that previous experience influences the allocation of attention in visual search. Here, we investigated the effect of previous experience in dual-target search: whether the experience of difficult search trials modulates observers' search strategy. Two subject groups differed in their previous search experience. An easy group performed only easy search trials in which a target was easily distinguishable from distractors by color. A hard group performed the same types of easy search trials in half of their trials, but in the other half, the search was relatively difficult because the target was barely distinguishable from some of the distractors in color. In Experiment 1, the hard group had a higher fixation rate for a color between two consistent target colors in color space, indicating that search was more likely to be guided by a target template representing a range of colors including the two target colors and this intervening color. In Experiment 2, this group difference disappeared when targets varied on each trial, which reveals a critical role of LTM. The present study demonstrates how previous experience can affect search strategy and shows that not all experience improves search performance. Email: Junha Chang, junhachang@umass.edu

12:00-1:30 PM (2040)

Developing an Oats (Operationalized Attentional Task Set): Assessing How Attentional Sets Change with Task **Experience.** RYAN E. O'DONNELL and BRAD WYBLE, *Pennsylvania State University* (Sponsored by Brad Wyble) – Performing a task molds an individual's understanding for how

to complete that task. Therefore, the task set that is actually used will differ from the task set provided by the textual instructions, once subjects have task experience. We term this rapid change in set to be the operationalized attentional task set (OATS). Understanding how the OATS forms is crucial because a correct understanding of the internal representation of the task is critical for interpretation of experimental results. This study attempts to manipulate and measure attentional set adjustment of to-be-searched targets by testing under what conditions an instructionally-defined attentional set (e.g., find the letter) changes when the actual trials contain only a subset of the category. Four experiments demonstrate how the attentional set in a search task changes rapidly with experience to reflect either a categorical set or an item-specific subgroup of the intended category.

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12:00-1:30 PM (2041)

Perceptual Hypotheses in Common-Onset Masking Seem to Be Location Specific. BERTRAND SAGER, VINCENT DI LOLLO, and THOMAS M. SPALEK, Simon Fraser University (Sponsored by Thomas Spalek) - A briefly-displayed target surrounded by 4 dots is identified easily if the dots terminate with the target, but not if the dots persist. This Common-Onset Masking is hypothesized to arise from a mismatch between a reentrant perceptual hypothesis and ongoing neural activity in primary visual cortex. One of the questions that remain unanswered is whether the perceptual hypothesis is restricted to the area of the target or whether it includes the entire display. Across three experiments, we found that target identification is progressively impaired as a function of target-mask separation. Although seemingly consistent with the notion that commononset masking is not restricted to the target location, we believe that our data reveal two effects. The first, common-onset masking, is restricted to the location of the target and occurs only when the target and the mask share a location. The second, metacontrast masking, the strength of which is known to vary as a function of target-mask separation, occurs when the target and the mask are spatially separated. Implications for theory and previous results are discussed. Email: Bertrand Sager, bsager@sfu.ca

12:00-1:30 PM (2042)

Do We Find Familiar Stimuli More Quickly? A Visual Search Experiment with Brand Logos. URSA BERNARDIC and BENJAMIN SCHEIBEHENNE, *University of Geneva* (Sponsored by Benjamin Scheibehenne) – The need for visual search arises frequently in everyday life; from routinely scanning web pages for preferred products, online articles for specific references or mobile devices for favored apps. Such visual attention can be guided by physical features of the stimuli (i.e. bottom-up effects) but also by search goals and long-term memory (i.e. top-down effects). While past research has often focused on bottom-up effects, such as color, shape, motion or size, less is known about top-down effects. To test how long-term memory influences visual search, this preregistered, within-subject design study (n=100) examined how the large variance in participants' prior experience with mobile apps



from two countries affected visual search task. The results confirmed that familiar logos were found faster than unfamiliar ones, suggesting that stimulus familiarity speeds up the visual search. By highlighting the pivotal role of stimulus familiarity, and such the influence of top-down effects on visual search performance, the present findings are important for better understanding of both, bottom-up and top-down effects which combines to shape search behavior. We discuss the implications of these results for cognitive and marketing theories. Email: Ursa Bernardic, ursa.bernardic@unige.ch

12:00-1:30 PM (2043)

The Distance Between a Salient Target and Distractor Has No Effect on N2Pc in the Absence of Low-Salience Distractors. BRANDI LEE DRISDELLE, ISABELLE CORRIVEAU, ULYSSE FORTIER-GAUTHIER, and PIERRE JOLICOEUR, Université de Montréal (Sponsored by Pierre Jolicoeur) - The N2pc is an electrophysiological index of visual attention toward lateral stimuli. Luck et al. (1997) showed N2pc amplitude increased when a low salience item was placed near a target and argued this reflected greater need for focused attention. Hilimire et al. (2009) showed that when two salient items were closer to each other, N2pc amplitude was smaller compared with when they were farther apart (in displays containing low salience items) and suggested that mutual suppression of the salient items increased as distance decreased. We tested whether interference from low salience items could explain this distance effect. Each display contained two salient items (a target and a distractor) and either 14 low salience items, presented on the perimeter of an invisible circle centered at fixation, or 2 low salience items in the visual field opposite and mirroring the salient items. The salient items were either adjacent, or separated by two, or by four possible stimulus positions. N2pc amplitude increased with increasing distance, but only when low salience items were nearby. Thus, the distance effect was caused by interference from low-salience distractors rather than by direct mutual suppression of the salient items.

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12:00-1:30 PM (2044)

Is Searching in Space Similar to Searching in Time? BRETT B.T. FELTMATE, KIRSTEN DICKIE, EMMA WALTON, and RAYMOND M. KLEIN, Dalhousie University (Sponsored by Jane Raymond) - In their 1989 paper "Stimulus Similarity and Visual Search", Duncan & Humphreys presented a 'search surface' which delineated two factors that conspire to determine the difficulty of visual search: the degree to which targets are visually similar to non-targets, and the degree of visual similarity amongst non-targets. While Duncan and Humphreys were concerned with searching in space it was suggested by Klein & Ishigami (2013) that perhaps these two factors might also apply when we are searching in time. To date no explicit test of this proposal has been made. Herein we asked participants to perform separate spatial (stimuli presented at the same time across space) and temporal (stimuli serially presented at the same location, across time; RSVP) search tasks. Divided into two groups, one was presented with lines of varying tilts, the other was presented with squares of varying hues; for both

groups stimulus similarity was selected according to the four corners of D&H's search surface. Performance in the 'colour' group replicated D&H in both spatial and temporal search; whereas performance in the 'line' group showed a similar trend but with some oddities requiring further study. Email: Brett B.T. Feltmate, brett.feltmate@dal.ca

12:00-1:30 PM (2045)

Differential Use of Color and Shape Cues in Visual Search. CARLY J. LEONARD, University of Colorado, Denver, JADA LISTER and CAILEY A. SALAGOVIC, University of Colorado, Denver - In visual search research, color cues are commonly thought to be more effective than shape cues at guiding attention. However, very little research has directly addressed the nature of this asymmetry. In the current work, participants performed a compound search requiring the orientation of a line inside a target shape to be reported. The target shape was always unique on both the color and shape dimensions, with homogeneous distractors (i.e., a red circle among blue squares). Before the search display, participants were given either a neutral cue (UNIQUE) or a type of informative cue. Informative cues were always valid and provided either target color (RED or BLUE), target shape (SQUARE or CIRCLE), or both (e.g., RED SQUARE). All cue type conditions were randomly intermixed within a block. As expected, neutral cues led to the slowest reaction times. Color cues and both cues showed the largest benefits, although there was no added benefit of the shape information. Shape cues were not effective relative to neutral cues. These results confirm that, all else being equal in terms of the search stimuli, shape cues were not well utilized. Follow-up experiments address issues related to motivation and discriminability.

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12:00-1:30 PM (2046)

Asymmetric Switch Costs Accompanied by Symmetric Suppression of the Alternate Language During Bilingual Reading. LIV J. HOVERSTEN, Basque Center on Cognition, Brain and Language, MATTHEW J. TRAXLER, University of California, Davis - Previous studies have shown switch cost asymmetries based on language dominance in bilingual language comprehension. However, these studies have produced mixed results in terms of the direction of effects. Furthermore, it remains unclear how language dominance interacts with language control processes in comprehension. The current study thus aimed to assess whether bilinguals apply a differential amount of control to dominant and weaker languages in two different language contexts. Eye movements were recorded while Spanish-English bilinguals (N=60) read sentences in one language that contained a critical word a) in the same language as the rest of the sentence, b) in the alternate language, or c) a pseudoword. In Experiment 1, critical words were presented overtly, while in Experiment 2, critical words were presented covertly as parafoveal previews using the boundary paradigm. Results demonstrate slower reading of the weaker language in both experiments and larger switch costs into the weaker language in Experiment 1. Critically, analyses using the pseudoword condition as a baseline show that the amount of language suppression was symmetric across languages regardless of switch direction in both experiments. Email: Liv J. Hoversten, lhoversten@bcbl.eu

12:00-1:30 PM (2047)

Cross-Language Influences Across Scripts - Evidence from a Visual Lexical Decision Task with Arabic-Hebrew Bilinguals and Arabic Learners. TAMAR DEGANI and MARIANA ELIAS, University of Haifa - Whereas ample evidence suggests that both languages of bilinguals are active and interactive, less is known about cross-language interactions in visual processing of different-script bilinguals. Here, 30 Arabic-Hebrew bilinguals and 30 native-Hebrew speakers, made visual lexicaldecisions on Hebrew words, including (1) cognates sharing phonology and meaning (e.g., /yeled/ is phonologically similar to its Arabic translation /walad/); (2) False-cognates sharing phonology but not meaning (e.g., /lechem/ in Hebrew means bread, but /lachem/ in Arabic means meat); and (3) control words not sharing phonology or meaning. Results showed significant cognate facilitation in accuracy and in RT, and a trend for false-cognate accuracy facilitation for Arabic-Hebrew bilinguals but not for native-Hebrew controls, suggesting that although Hebrew orthography could have served as a valid cue for language-membership, cross-language phonological overlap affected bilinguals' performance. These findings will be compared to those of beginning-learners of Arabic, to examine how early in learning do cross-language interactions emerge. Email: Tamar Degani, tdegani@research.haifa.ac.il

12:00-1:30 PM (2048)

The Bluegrass Corpus: Audio-Visual Stimuli to Investigate Foreign Accents. SARA INCERA and BAILEY MCGUFFIN, Eastern Kentucky University - The Bluegrass corpus includes sentences from 40 pairs of speakers. Participants from the Bluegrass Region rated one speaker per pair as having a native American-English accent and the other as having a foreign accent (Experiment 1). Furthermore, the speakers within each pair look very similar, in that participants rated them similarly likely to have a foreign accent (Experiment 2). For each speaker we selected four easy and four difficult sentences based on participants' ratings of difficulty (Experiment 3). The final corpus includes a selection of 640 sentences (80 speakers, 8 stimuli per speaker), freely available through the OSF. Each sentence can be downloaded in different formats (text, audio, video), so researchers can investigate how audiovisual information influences language processing. Researchers can contribute to the corpus by validating the stimuli with new populations, by selecting additional sentences, or by finding new TED videos featuring appropriate speakers to answer their research questions.

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12:00-1:30 PM (2049)

Using Eye-Tracking to Examine Anticipatory Cues to Grammatical Gender and Codeswitching: Evidence from Spanish-English Bilinguals. PAOLA E. DUSSIAS, Pennsylvania State University, ANNE L. BEATTY-MARTÍNEZ, Pennsylvania

State University, ROSA E. GUZZARDO TAMARGO, University of Puerto Rico-Río Piedras (Presented by Paola Dussias) (Sponsored by Paola Dussias) - Two eye-tracking experiments examined whether Spanish-English bilinguals exploited grammatical gender cues during comprehension, and whether gender cues modulated bilinguals' expectations regarding the likelihood of codeswitching. Unilingual and codeswitched noun phrases were compared in conditions where determiner gender could be used informatively or not. Findings showed an anticipatory effect in informative contexts, regardless of determiner gender or noun language, but there was a processing cost associated with codeswitches preceded by feminine determiners. In Experiment 2, we examined whether exposure to inconsistent gender modulated anticipatory effects observed in Experiment 1. Half of the participants were exposed to incongruent masculine determiners and half were exposed to incongruent feminine determiners. The results showed that the proportion of target looks was significantly higher in conditions with 100% determiner gender consistency. Overall, findings indicate that individuals are sensitive to variation in their linguistic experience and suggest that this tuning holds consequences for language processing.

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12:00-1:30 PM (2050)

Structural Priming of Sentence Cross-Language Comprehension in Bilingual Children: A Picture-Selection Mouse-Tracking Study. GERRIT JAN KOOTSTRA and SHARON UNSWORTH, Radboud University - Sentence processing in bilinguals is shaped by cross-language activation: both the target and non-target language influence processing preferences. This is reflected in cross-language structural priming: bilinguals' syntactic preferences in one language are affected by exposure to other-language syntactic structures. Importantly, cross-language structural priming is underexplored in bilingual children, and unexplored in comprehension. This is not a trivial point: the extent and nature of cross-language influence in bilingual children is not at all a settled issue, let alone the processing mechanisms underlying it. To fill this research gap, we created a structural priming experiment in which Dutch-English and Dutch-German bilingual children listened to Dutch ambiguous sentences and had to use the mouse to select one out of two pictures that they thought matches the presented sentence. Picture selections and mouse movements point to evidence of short-term and cumulative structural priming within and across languages, thus providing the first evidence of cross-language structural priming in comprehension in bilingual children. The results inform theories on priming, implicit learning, and crosslinguistic influence in bilinguals.

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12:00-1:30 PM (2051)

Bilingual Experience Changes Associations Between Concepts. SIQI NING, JAMES BARTOLOTTI, and VIORICA MARIAN, *Northwestern University* – Language can influence our conceptual representations in domains ranging from temporal processing to color perception. Three behavioral and one ERP experiments were conducted to examine whether experience with multiple languages can change how we form associations between concepts. In Experiment 1, bilinguals rated semantically unrelated picture pairs as more related than monolinguals. Experiment 2 replicated this effect for unrelated words, but not for semantically related ones. Experiment 3 showed that increased semantic similarity ratings are only seen in high-proficiency bilinguals. In Experiment 4, ERP results indicated that bilinguals may have increased semantic relatedness for concept pairs regardless of inherent relations, suggesting that neurological measures may be more sensitive in assessing concept associations than behavioral tasks. These results show that bilingual experience can change semantic associations. We propose that bilinguals' denser and more interconnected lexical networks may provide shorter paths linking concepts to each other, resulting in reduced semantic distance.

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12:00-1:30 PM (2052)

Automatic Activation of Metaphorical Representations of Emotional Concepts in Chinese-English Bilinguals: The Role of Linguistic Context and Cultural Face Cues. NATALIE A. KACINIK and JUNQING CHEN, The Graduate Center CUNY & Brooklyn College, YONGXIN ZHANG and NIANYANG WU, Shanghai Normal University (Presented by Natalie Kacinik) -Conceptual Metaphor Theory (Lakoff & Johnson, 1980) claims that people use more concrete knowledge to represent abstract concepts through metaphorical mappings. An Emotional Stroop-like experiment showed that color-emotion metaphors (Anger is Red) used in both English and Chinese are also mentally represented in speakers of those languages, whereas an effect of the Chinese "Happiness is Red" metaphor only occurred in Chinese but not English participants. Another study with Chinese-English bilinguals found that metaphors shared across both languages (Anger Is Red) or learned from L1 (Happiness Is Red) were automatically activated in either language context. A final study examined whether cultural face cues can moderate activation of color-emotion metaphors in Chinese-English bilinguals. In the Chinese language context, a Red-Happiness effect was found regardless of whether participants were primed by Chinese or Caucasian faces. However, when tested in English, a metaphorical effect only occurred with Caucasian faces congruent with the language context.

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12:00-1:30 PM (2053)

Cross-Linguistic Effects of Intention Recognition in Malay-English Bilinguals. MAZIYAH MOHAMED and DEBRA JARED, *University of Western Ontario* – In Malay, accidental actions are marked with the prefix *-ter*. Malay speakers typically assume a deliberate intent when the prefix is absent. We investigated whether Malay-English bilinguals are more likely than English monolinguals to interpret actions in English sentences as deliberate when they are not clearly indicated as being accidental. Participants completed a cross-modal priming task. They first heard scenarios in which a character's action was either accidental or was ambiguous as to intent, and then they saw either a word that was consistent with an unintendedaction interpretation, an unrelated word, or a nonword and made a lexical decision. The grammatical intention marker in Malay influenced speakers' perception of intentions even when listening to English. Bilinguals showed a smaller priming effect than monolinguals only in the ambiguous condition, suggesting that they were more likely to have interpreted intentionambiguous actions as deliberate. These findings inform our understanding of cross-cultural communication differences. Email: Maziyah Mohamed, mmoha87@uwo.ca

12:00-1:30 PM (2054)

Linking Bilingual Language Experience to the Use and Comprehension of Irony. MEHRGOL TIV and NAOMI VINGRON, McGill University, VINCENT ROUILLARD, Massachusetts Institute of Technology, FIONA DEODATO, SABRINA WIEBE, and DEBRA TITONE, McGill University (Sponsored by Debra Titone) - Irony, including sarcasm, juxtaposes linguistic content and speaker intent. We investigated whether bilingual experience modulates the use and comprehension of irony, since both draw upon general cognitive capacities such as executive control and perspectivetaking. We first evaluated whether second language (L2) experience (proficiency, age of acquisition) related to sarcasm use. 116 bilingual adults completed the Sarcasm Self-Report Scale. Principal components analysis yielded separate general sarcasm, frustration diffusion, and embarrassment diffusion dimensions. Crucially, increased L2 proficiency patterned with greater general sarcasm use. Next, a subset of participants (49) read and judged the sensibility of English scenarios followed by ironic (including sarcastic), literal, or anomalous statements. Here, greater L2 proficiency patterned with facilitated comprehension of irony, particularly for non-canonical uses of irony. Collectively, these data suggest that bilingual experience potentially modulates both the everyday use of sarcasm, as well as irony processing more generally, a hypothesis we continue to pursue.

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12:00-1:30 PM (2055)

Translation Ambiguity Processing: Evidence from English-German Primed Translation Recognition. GREG POARCH and SARINA LANGER, University of Münster (Presented by Greg Poarch) - It is a predominant phenomenon across languages that a word in one language may have more than one corresponding translation in another. Research has found that translation ambiguity has a negative effect on the speed and accuracy of language processing in both beginning L2 learners and proficient bilinguals (Degani et al., 2016; Laxén & Lavaur, 2010). The present study builds on Eddington and Tokowicz (2013) and explores translation ambiguity in backward L2 to L1 translation. Thirty-eight German-English bilingual students with varying English proficiencies had to decide whether English-German word pairs preceded by semantically related (tree-trunk-Stamm) or unrelated (host-money-Geld) English primes were correct translations. The results showed that 1) translation-ambiguous words were processed slower than unambiguous words; 2) related primes did not facilitate word pair processing; 3) dominant translations were processed faster than subordinate ones; and 4) translation-ambiguous words with two related translations were processed faster than those with unrelated translations. The results will be discussed against the backdrop of L2 proficiency differences and their role in the processing of translation ambiguity.

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12:00-1:30 PM (2056)

Bilinguals Activate French Word Meanings from English Interlingual Homophones When Reading English Sentences. DEANNA C. FRIESEN and OLIVIA WARD, University of Western Ontario, JESSICA BOHNET and PIERRE CORMIER, Université de Moncton, DEBRA JARED, University of Western Ontario - Friesen et al. (2019) concluded that bilinguals activate languages' shared phonology, and in turn, activate cross-language meaning based on findings from an eye tracking study in which French interlingual homophones (e.g., mot "word", a homophone of mow in English) and French control words (e.g., mois) were inserted into English sentences (e.g., Billy was too lazy to mot/mois the lawn). The current study used a subtler manipulation wherein 83 bilinguals read entirely English sentences (e.g., Hannah wrote another mow/mop on the blackboard for the spelling test). Shorter first fixations and gaze durations were observed on interlingual homophones than on control words when the French member of the homophone pair was low in frequency, indicating that the French meaning of the shared phonology was activated during early-stage word processing. Effects were more robust for bilinguals who were using the non-target language (i.e., French) daily. Results provide evidence that cross-language activation of phonology can be sufficiently strong to activate corresponding semantic representations during single language sentence processing. Email: Deanna C. Friesen, deanna.friesen@uwo.ca

12:00-1:30 PM (2057)

Individual Differences in Gray Matter Volume Predict Bilingual Speech Perception in Noise. ANGELA M. GRANT, Concordia University, SHANNA KOUSAIE, McGill University, KRISTINA COULTER, Concordia University, ANNIE C. GILBERT, SHARI R. BAUM, VINCENT GRACCO, DENISE KLEIN, and DEBRA TITONE, McGill University, NATALIE A. PHILLIPS, Concordia University - Speech perception in noise (SPIN) is difficult, and even more so in a second language (L2). Regions such as the inferior frontal gyrus (IFG), angular gyrus (AG) and Heschl's gyrus (HG) are important for performance on SPIN tasks, and in our study, we investigate how gray matter volume (GMV) may predict bilingual speech comprehension in noise. We collected T1-weighted structural images from a sample of 27 (M age = 25; SD= 4.3) English/French bilinguals (ML2 AoA = 3.9; SD=3.5). During the task, participants heard sentences in both noise (16-talker babble) and quiet that varied in their semantic constraint in each language. After each sentence, they repeated the final word. Trial-level accuracy was modeled as a function of GMV, language, semantic constraint, and listening condition. We found a positive relationship between GMV in left IFG and performance in noise and low

constraint conditions, regardless of language. In the right IFG, there was a positive relationship between GMV and performance in L2 regardless of constraint, and in L1 for low constraint sentences only. Our results suggest that individual differences in GMV predict not only speech comprehension in noise, but during suboptimal processing conditions generally. Email: Angela M. Grant, angela.grant@concordia.ca

12:00-1:30 PM (2058)

Cross-Language Activation in Bilingual Language Processing: Examining the Role of Language Context. REINA MIZRAHI and SARAH C. CREEL, University of California, San Diego (Sponsored by Sarah Creel) - Bilinguals must process one language at any given time without intrusion of the other. Previous studies have focused on the relationship between bilinguals' two languages in a monolingual-like contexts (Spivey & Marian, 1999); yet, bilinguals often find themselves in environments requiring both languages. In a 4-alternative forced choice task with visual-world eye-tracking paradigm, we tested how language context—bilingual (intermixed languages) vs. monolingual (blocked by languages)-affects cross-language activation. On each trial, participants (n = 72) saw four images while listening to the target word: (1) Target - chicken (2) Competitor - A word that shares initial phonetic features in the other language (i.e., chicle=gum) and (3-4) Unrelated distractor images (i.e., *leaf/book*). We found cross-language activation in Spanish-English bilinguals, ß=0.232, SE=0.036, p<0.0001, but no difference across language contexts, ß=0.005, SE=0.036, p=0.884. This suggests that single-language contexts may not reduce activation of the other language, contributing to our understanding of the mechanisms regulating dual-language activation.

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12:00-1:30 PM (2059)

Clitic Pronoun Processing in Heritage Spanish Speakers. BEVERLY TERESA COTTER, California State Polytechnic University, Pomona, ELEONORA ROSSI, University of Florida (Sponsored by Judith Kroll) - Heritage speakers are bilinguals whose native language is learned informally (usually from childhood). Previous literature in heritage language processing has highlighted that heritage speaker's processing is highly varied (Montrul 2012). There is little known about the neurophysiological signatures of heritage language processing, so here we investigate bilingual language processing for Heritage speakers of Spanish that have not received formal language education. We took an individual difference approach and tested 50 participants, utilizing behavioral and EEG measures during a Spanish sentence comprehension task, in which we manipulated pronoun violations. Preliminary results demonstrate three significant trends: no sensitivity to the grammatical violation, or an N400 modulation, similar to what observed in late-second language, or a native-like P600 effect to the pronoun violation. Critically these signatures suggest their variability was modulated by the relative proficiency levels in the heritage language.

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12:00-1:30 PM (2060)

Morphological Representations in L2 Words: Masked Priming Investigation with Japanese-English Bilinguals. JESSIE WANNERKAWAHARA, Tohoku University, MASAHIRO YOSHIHARA, Waseda University, STEPHEN J. LUPKER, University of Western Ontario, MARIKO NAKAYAMA, Tohoku University (Sponsored by Mariko Nakayama) - Previous masked priming experiments indicate that the L2 English lexicon of different-script (e.g., Japanese-English and Chinese-English) bilinguals is organized somewhat differently than the L1 English lexicon of monolinguals (Nakayama et al., 2018; Qiao & Forster, 2017). The present experiment was an investigation of Japanese-English bilinguals' L2 word recognition process at the morphological level. For L1 English readers, past-tense primes (e.g., fell-FALL) facilitate lexical decisions to targets relative to both orthographic primes (e.g., fill-FALL) and unrelated primes (e.g., hope-FALL), and such effects are typically interpreted as being morphological in origin (e.g., Crepaldi et al., 2010; Feldman et al., 2010). For Japanese-English bilinguals, however, past-tense and orthographic primes produced statistically equivalent facilitation effects, a pattern that held for both regular (e.g., talked-TALK) and irregular verbs. Our results suggest that morphological level representations do not develop in the L2 lexicon of Japanese-English bilinguals, at least for this type of morphological relationship.

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12:00-1:30 PM (2061)

Modeling Fine-Grained Word Similarity with Embeddings from Language Corpora, Free Association, and Feature Norms. RUSSELL RICHIE, University of Pennsylvania, BRYAN WHITE, New Mexico State University, SUDEEP BHATIA, University of Pennsylvania, MICHAEL C. HOUT, New Mexico State University - Psychologists often collect similarity data to understand fine-grained categorical structure (Shepard, 1980). However, collecting similarity judgments between all pairs of items in a category is expensive, leading to calls for new techniques for collecting similarity data (Hout et al., 2013). Here we assess six classes of vectors derived from language corpora, word associations, and feature norms on their ability to model word similarity data collected for eight categories (furniture, clothing, birds, vegetables, sports, vehicles, fruit, and professions). First, cosine similarity between raw embeddings moderately correlated with true similarities (mean r=.44). Second, by using true similarities to supervise learning of feature weights specific to each category (Peterson et al., 2018), we modestly improved out-of-sample correlations (r=.58). Finally, using similarity data from all categories to learn a single, domain-general weight vector led to the best out-of-sample performance (r=.70). We conclude that word embeddings can be used, potentially with additional specialization or learning, to study similarity and representation.

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12:00-1:30 PM (2062)

Metaphorical Use of Color and Racial Bias: An Erp Study. PEIYAO CHEN, MCKENZIE HIMELEIN-WACHOWIAK, SHELBY BILLUPS, and FRANK H. DURGIN, *Swarthmore*

College - The present study investigated whether racial bias, measured by the Implicit Association Test (IAT), can be partially attributed to the metaphorical use of color (e.g., black market, white lies). We compared ERP signatures in two IATs where morality judgment (good-evil) was associated with color judgment (black-white, color IAT) or with race judgment (blackwhite, race IAT). The critical comparison was made between the metaphorically compatible (aligning the black response with the evil response) and metaphorically incompatible condition (aligning the black response with the good response). The ERP results show that the metaphorically incompatible condition elicited a larger late positive component (LPC) on the centroparietal sites than the compatible condition during the 600-800 ms time window in the color IAT, but not in the race IAT. However, analysis restricted to individuals showing a racial bias, indicated by their d-scores, reveals a similar effect of LPC in the race IAT, although the LPC effect was weaker and appeared in a later time window. These results suggest that implicit racial bias may be partially attributed to associating the color black with negative concepts and the color white with positive concepts. Email: Frank H. Durgin, fdurgin1@swarthmore.edu

12:00-1:30 PM (2063)

I've Got that Pitch Metaphor Stuck in My Head. ELENA NICOLADIS, University of Alberta - Some research has shown that language can influence thought. Once influenced by language, it is not clear how malleable thought is. The purpose of the present study was to test whether it was possible to change the metaphorical associations to corresponding visual stimuli over a short period of time. Different languages use different spatial metaphors to describe the pitch of auditory stimuli (e.g., in English, high/low; in Farsi, thin/thick). Studies have shown that these metaphors influence how speakers think about pitch. In Study 1, we show that English speakers are biased to associate both high lines and thin lines with highpitched notes. In Study 2, we asked participants to learn an association between high-pitched notes and spatially low or thick lines (and vice versa) over 80 trials. Participants easily mastered the thick-line associations. In contrast, for the lowline associations, some participants were highly accurate by 30 trials and showed few errors subsequently. Other participants still made errors at 80 trials. These results suggest that there may be individual differences in the degree of entrenchment of the pitch metaphor. We speculate as to what cognitive abilities may underlie these individual differences.

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12:00-1:30 PM (2064)

Visual Features Influence Expressed Thoughts About Images Lacking Overt Semantic Content. KATHRYN E. SCHERTZ, OMID KARDAN, and MARC G. BERMAN, *University of Chicago* (Sponsored by Marc Berman) – It has recently been shown that both low-level (e.g., edges) and high-level (e.g., naturalness) visual features can influence thought content, in real-world and experimental settings. It remains to be seen however, if these visual features retain their influence on thoughts in the absence of overt semantic content. In this study, we removed this limitation, by creating scrambled edge versions of images, which maintain edge content but remove scene identification. Here we replicate previous findings demonstrating that perceiving non-straight edge density can increase thoughts of spirituality and life journey, as well as showing that perceived naturalness can increase thoughts about nature. These results strengthen the implication of a causal role for the perception of low-level visual features on the influence of higher-order cognitive function, by demonstrating that in the absence of overt semantic content, low-level features, such as edges, influence cognitive processes.

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12:00-1:30 PM (2065)

People Are More Likely to Use Classification Rules When FeaturesAreEasytoDescribeVerbally.BAILEYN.BRASHEARS and JOHN PAUL MINDA, University of Western Ontario -We investigated the effects of feature nameability on the acquisition of novel concepts. Participants in our experiment learned a category set that could be acquired by either a perfectly predictive rule or an overall family-resemblance strategy. Half of our participants learned the set with features that were easy to name and describe verbally and the other half learned the set with features that were not easy to name and describe verbally. After learning, participants were transferred to a set of new exemplars that included stimuli designed to distinguish between rule strategies and family-resemblance strategies. We found that people who learned the categories with easier to name features were more likely to classify new stimuli in accordance with a rule-based strategy. People who learned the categories with difficult to name features showed evidence of both rule use and family resemblance responding and no clear preference for either strategy. The results of this study open up a novel area of research within the field of category learning to further explore the effects of feature nameability on classification preference. Email: Bailey N. Brashears, bbrashea@uwo.ca

12:00-1:30 PM (2066)

The Disappearance of Prototype Effect in Response Times in a Visual Categorization Study. KRISZTIAN BORBELY, JULIA BAROSS, and ESZTER DORA SZABO, Eötvös Lorand University - Prototype effect is a widely known phenomena in categorization literature, which includes more accurate and faster responses to prototypes compared to other category members in category decision paradigms. The method used in this study is similar to well-known family resemblance structure based visual categorization studies. In addition to the usual builds of these studies, we modified the paradigm to control the one-dimensional bias, that makes most of the people use an explicit strategy, even when finding a successful explicit strategy is extremely difficult. While the prototype effect for hit rates are present, we observe the disappearance of the effect when examining response times on

the data of 599 Hungarian adult participants. We expect, the cause of this phenomena is the prevention of the one-dimensional strategy, which forces people to use different unusual categorization decision strategies. We also successfully replicated the phenomenon on Hungarian elders (N=123) and mixed nationality adults (N=52). Email: Anett Rago, rago.anett@ppk.elte.hu

12:00-1:30 PM (2067)

Cognitive Interference and Category Learning: A Tale of Two Systems. JOSHUA JOHN HATHERLEY, RSHA SOUD, and JOHN PAUL MINDA, Western University (Sponsored by John Minda) - We investigated the relationship between working memory, procedural memory, and category learning. The COVIS model assumes that category learning is regulated by an explicit system which uses working memory and an implicit system which uses procedural memory. Research by Minda et al. (2008) used a co-articulation task to disrupt disjunctive-rule category learning and Miles and Minda (2011) used a switching task to disrupt rule-based category learning. However, Minda et al. (2008) failed to find a link between performance on single-dimensional category sets and working memory. Miles and Minda (2011) used a demanding task that interfered with verbal working memory, visual working memory, and executive functions but did not specify if one or all of these processes caused the disruption. The present study addressed these limitations by asking people to learn either a ruledefined or a nonrule-defined category set while completing a concurrent task that interfered with either verbal working memory or procedural memory. Results indicated that both the verbal working memory task and the procedural memory task impaired the learning of rule-defined categories but had no effect on the learning of nonrule-defined categories. Email: John Paul Minda, jpminda@uwo.ca

12:00-1:30 PM (2068)

Learning Categories from Categorical Versus Continuous Feedback: A Behavioral and Model-Based Comparison. ASTIN C. CORNWALL, Texas A&M University, KAILEIGH A. BYRNE, Clemson University, TYLER DAVIS, Texas Tech University, DARRELL A. WORTHY, Texas A&M University -When learning to categorize novel stimuli, the type of feedback may play a role in facilitating the rate at which the categories are learned. Two common types of feedback in response to a decision are categorical and continuous feedback, where people are either explicitly told the outcome of their choice or given continuous reward-based reinforcement, respectively. Here, we detail simulations of a category learning experiment with different conditions comprised of two categorization rules, two reward structures, and the two feedback conditions of either categorical or continuous reward feedback using ALCOVEbased connectionist models. In line with the predictions of the simulations of each of the eight conditions, we show that both types of feedback promote the learning of categories, but better effects of learning are predicted by the models and observed in human participants when categorical feedback is provided than reward feedback alone. These findings suggest that in categorization tasks, and possibly reinforcement learning tasks, that additional categorical feedback may be an effective aid from

information alone. Email: Darrell A. Worthy, worthyda@tamu.edu

12:00-1:30 PM (2069)

in learning as compared to learning from continuous reward

Effects of Feedback on Categorical Judgement and Resilience to Concept Boundary Change. KEVIN NAM, MYEONGJIN LEE, INJAE HONG, and MIN-SHIK KIM, Yonsei University - The change in the prevalence of a stimulus has shown to cause changes in concept boundaries, towards harboring more of the rare stimulus. Levari et al. (2018) explored the change in categorical boundary between the blue and purple spectrum. In a categorical judgement task, as the prevalence of blue dots diminished, participants expanded their concept of blue, categorizing purple dots as blue more frequently on later trials, despite informed knowledge or performance-based rewards. This phenomenon was coined "prevalence-induced concept change." Our experiment explored whether this phenomenon of concept change can be lessened or eliminated by providing an objective form of feedback. We provided an answer feedback of the location on the spectrum after each trial to help participants with their perception and judgement of future trials. Participants displayed resilience towards change in concept boundaries when presented with feedback before and during the change in prevalence.

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12:00-1:30 PM (2070)

The Impact of Category Learning on Item Similarity: Effects of Learning Mode and Category Structure. MATT WETZEL and KENNETH J. KURTZ, Binghamton University, SUNY (Sponsored by Kenneth Kurtz) - A growing literature demonstrates that the perceived similarity of pairs of stimulus items in a domain changes as a result of category training. The evidence suggests that this phenomenon is mediated by a number of different factors including: number of relevant features, difficulty of the task, and the particular structure in which categories are arranged. The present work addresses how such shifts in similarity are mediated by category learning modes that vary along the continuum between discriminative and generative methods: standard classification versus endorsement (e.g., A/~A). In addition, we extend beyond previous research by testing 3-way categorization tasks in a two-dimensional continuous-valued domain. We report effects of learning mode on category acquisition and perceived similarity. In addition, formal models of category learning are evaluated for their ability to account for the observed pattern of results. Email: Matt Wetzel, mwetzel2@binghamton.edu

12:00-1:30 PM (2071)

A Bayesian Approach to Conceptual Combination: Constructing Complex Social Categories from Distinct Group Membership Information. ALICE XIA, SARAH H. SOLOMON, SHARON L. THOMPSON-SCHILL, and ADRIANNA C. JENKINS, University of Pennsylvania – The compositional structure of semantic knowledge allows humans to build complex and even entirely novel concepts from simple ones, a process known as conceptual combination. Although previous research has examined how inferences about compound objects (e.g., fuzzy chair) are produced from their constituent concepts, little is known about the combinatorial processes that produce inferences about complex social categories. Here, we investigated how complex social categories (e.g., Irish Nurse) are constructed from information about their constituent groups, identified by nationality and occupation. Capitalizing on the observation that social perceptions can be organized along dimensions of warmth and competence, we compared the ability of two different models to predict participants' warmth and competence ratings of 25 complex social groups. We find that a Bayesian model outperforms a simpler additive model in predicting participants' ratings, and the degree to which this is true is modulated by self-reported familiarity. These results suggest that the mind incorporates both uncertainty about the traits of constituent groups and familiarity with the compound group into judgments about people belonging to multiple social categories.

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12:00-1:30 PM (2072)

Beauty Is in the Eye of the Beholder: Body Image and Viewing Patterns of Physique Images. APRIL KARLINSKY, HOLLY HOWE, and MELISSA DEJONGE, University of Toronto, ALAN KINGSTONE, University of British Columbia, CATHERINE SABISTON and TIMOTHY N. WELSH, University of Toronto - People are bombarded with media images of bodies. Here, we investigated: 1) predictors of attention to different physiquesalient images; and, 2) how media consumption influences affect. Men and women participants were discretely exposed to images of same-sex models with ideal- and average-physiques while completing an irrelevant computer task. Hidden cameras recorded gaze at the images. Participants also reported body appreciation, body envy, and affect. Men and women did not differ in how often they attended to the images, but gaze patterns were mediated by trait variables. Men with lower body appreciation and higher envy gazed more often at the average- than the ideal-physique image. While women reported higher body envy than men, envy did not predict their gaze patterns. Both men and women reported a decrease in positive affect following image exposure. These findings suggest that body image factors shape how individuals choose to attend to physique-salient media. Further, media consumption may have negative consequences for post-exposure affect. Body image factors appear to be stronger predictors of behavior in men, who are generally less often exposed to physique-salient media and in particular to average-physique images.

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12:00-1:30 PM (2073)

Reaching Movements for Touching Increase the Likability of Objects. TAKASHI MITSUDA, LUO JIAWEI, and WANG QIYAN, *Ritsumeikan University* – This study examined the relation between hand movements and preference judgement
using haptics. Participants chose a handkerchief they liked more from two after touching them in a pre-determined order. The handkerchiefs were covered by a box so that participants chose one by the feel of touch without looking at them. Results showed that participants preferred a handkerchief they touched more frequently than the other. The liking effect was more significant when participants moved their arm to touch the handkerchiefs placed side-by-side, compared to when they touched the handkerchiefs carried by a machine to lie underneath their hand. These results indicate that the reaching movement for touching affects the preference judgement using haptics.

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12:00-1:30 PM (2074)

It's Not Just the Age, It's the Emotion: Own Age Bias Is Mediated by Emotion. CATHERINE L. REED, Claremont McKenna College, MORGAN K. BERLIN, Pomona College, EMILY DIAMOND and HANNAH M. POTTER, Scripps College, ADRIENNE JO, JESSICA H. KIM, and ABRAHAM SAIKLEY, Claremont McKenna College, JANE W. COUPERUS, Hampshire College, CINDY M. BUKACH, University of Richmond - The Own Age Effect (OAE) refers to a bias for older and younger adults to better recognize those of their own age group. Previous studies have investigated how emotion interacts with the OAE in memory, but few have investigated whether emotion interacts with the OAE during face perception. In an ERP study, young adults (ages 18-23) viewed older and younger adult male faces while performing one-back tasks for facial identity (discriminate facial identity, ignore emotion expression) and emotion identification (discriminate emotional expression- anger, fear, neutral, ignore identity). Greater N170 amplitudes at PO7/PO8 electrodes were found for young adult than for older adult faces in both face and emotion tasks, documenting the OAE. However, an interaction was found between viewed face age and emotion: greater N170 amplitudes were found for older faces with fear expressions and for young adult faces with angry expressions. Fear expressions in older adults indicate a potential nearby threat. Anger expressions on younger male adults are threats themselves. These results are consistent with the idea that attention is drawn to information relevant to threat and our subsequent actions. Email: Catherine L. Reed, clreed@cmc.edu

12:00-1:30 PM (2075)

Effects of Anxiety on Spatial Negative Priming. JASMINE BONSEL and HIDEYA KOSHINO, *California State University*, *San Bernardino* (Sponsored by Hideya Koshino) – Attentional Control Theory claims anxiety consumes working memory resources, resulting in impairments in executive functions, including inhibition of distractor information (Eysenck et al., 2007). In the present study, we investigated the effect of high and low anxiety on spatial negative priming. In a spatial negative Priming (NP) that reaction times (RT) are slower when a probe target is presented at a prime target location (Ignored repetition: IR) compared to when there is no relationship between the prime and probe. If inhibition is impaired for individuals with high anxiety, they should show greater negative priming compared to individuals with low anxiety. Results showed a negative priming effect for the high anxiety group and a positive priming effect for the low anxiety group. Effects of anxiety on distractor processing will be discussed.

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12:00-1:30 PM (2076)

Digital Emotions. DANA CHESNEY, St. John's University, ANTHONY PALOMBA, St John's University - We investigate whether individuals' media consumption choices are based on attempts to manage their mood. Specifically, we predict that people will be more likely to engage with nostalgic than modern content when they are in a negative emotional state, in an effort to improve their mood. In the current study, we test this using both experimental and correlational techniques. Participants are randomly assigned to view one of two mood induction videos: a happy mood induction (viewing Pharrell Williams' "Happy" music video) or a sad mood induction (viewing an ASPCA video with Sarah McLachlan). Afterwards, participants are asked if they wish to view a nostalgic video game play clip (Super Mario Brothers) or a modern video game play clip (A Way Out). We evaluate participants' emotional state before and after each video clip. We hypothesized 1) that participants in a more negative mood would be more likely to choose to view the nostalgic video clip, 2) that consequentially, participants in the negative mood induction condition would be more likely to choose to view the nostalgic clip, and 3) that those who view the nostalgic video clip would have greater mood improvement than those who view the modern clip.

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12:00-1:30 PM (2077)

A Generalization Bias to Treat Novel Stimuli as Negative in Distressed (Type D) Individuals Supports a Learning Diathesis Model of Ptsd. TODD ALLEN, University of Northern Colorado, DANIEL MILLER, Carthage College -Distressed (Type D) personality involves social inhibition and negative affectivity and is associated with PTSD as well as enhanced associative learning. Recent studies have reported biased generalization to novel situations and overgeneralization with negative contexts. It is unclear whether these biases in generalization result from trauma and subsequent PTSD or are evident in pre-existing temperaments such as Type D personality. Undergraduates (n = 102; 70 females and 32 males) completed the DS-14 inventory and a task where they picked or skipped stimuli that consisted of a foreground (shape) and a background (color) that were either positive or negative (i.e., resulted in either a gain or loss of points). A subsequent generalization phase included trained as well as novel stimuli. Type D individuals to pick positive stimuli and skip negative stimuli normally. In the generalization phase, individuals exhibited a normal generalization curve, but Type D individuals skipped novel backgrounds significantly more than non-Type D individuals. These findings indicate that generalization biases to treat novel stimuli as negative pre-exist in personality temperaments related to PTSD which supports a learning diathesis model of PTSD.

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12:00-1:30 PM (2078)

Collective Future Thinking: The Role of Group Dynamics. YUCHEN LI, University of Illinois at Chicago, KARL K. SZPUNAR, University of Illinois at Chicago (Sponsored by Karl Szpunar) - People tend to have a positive view of their personal future and a negative view of their collective future (Shrikanth et al., 2018). Also, negative or threat-related information is more likely to be socially transmitted (Bebbington et al., 2016; Blaine & Boyer, 2017). The current project investigated whether this negative bias adds on to the negativity of collective future thinking. We asked participants to talk separately about excitement and worries in the future of the United States either on their own or in pairs. Consistent with our hypothesis, participants talked more about worries both with and without a partner. This provides further evidence for the robustness of negative bias in collective future thinking in situations where people collaborate with each other. However, we did not observe the predicted increase in the collective negativity bias in paired participants. In a follow-up study, we plan to further explore conditions that give rise to and that may magnify the negativity bias in collective future thinking.

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12:00-1:30 PM (2079)

Differential Effects of Phonological and Visual Fluency on Affective Judgments of Names. YUH-SHIOW LEE, National Chung-Cheng University - This study examined the effects of visual and phonological fluency on liking judgments of a name. Two sets of Chinese names that differed only in pronunciation ease and not in visual perceptual and conceptual fluency were used to manipulate phonological fluency. The names were presented in high or low character-background contrast conditions to manipulate visual fluency. Both phonological and visual fluency influenced liking judgments, and the two effects were additive (Experiments 1 and 2). As compared with low visual fluency, names presented in a high visual fluency condition were rated to be more associated with a positive figure (Experiment 3) and less associated with a negative figure (Experiment 4). Phonological fluency manipulation did not produce such effects. Results are discussed in terms of the difference in the awareness of manipulation between the visual and phonological fluency and how this difference determined the effect specificity on affective judgments of names. Email: Yuh-shiow Lee, psyysl@ccu.edu.tw

12:00-1:30 PM (2080)

Effects of Emotionality on Memory Predictions and Performance in Cued Recall: Cue Type and List Composition Matter. HEUNGCHUL LEE, NIR & Ajou University, YOONHEE JANG, University of Montana (Presented by Heungchul Lee) (Sponsored by Yoonhee Jang) – We examined how emotionality affects memory predictions and performance in cued-recall paradigms, using negative emotional (N) and taboo (T) words, compared to neutral (n) words. Specifically, including all possible cue-target combinations (e.g., NN, Nn, nN, nn), we tested whether list composition (mixed vs. pure lists) influences memory predictions and performance. In Experiment 1, predictions increased when the cue word was N (vs. n), regardless of list type. However, accuracy increased when the cue word was n (vs. N). Participants exhibited overconfidence only when completely mixed lists were used. In Experiment 2, predictions and accuracy increased with a taboo word for both cues and targets in mixed lists. However, in pure lists, predictions were greater when the cue word was T (vs. n) while accuracy was greater when it was n (vs. T). We discuss the variations in diagnosticity of emotionality within and across lists as a cue for memory predictions.

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12:00-1:30 PM (2081)

I'm Happy to Remember Your Name: The Influence of Emotion and Focus on Face-Name. ALLISON M. WILCK, MATTHEW PASCAZI, and JEANETTE ALTARRIBA, University at Albany, SUNY (Sponsored by Jeanette Altarriba) - A robust literature on memory processing indicates that the emotional valence of studied items influences subsequent recall. Specifically, emotions associated with approach behaviors (e.g., happy) tend to produce a memory advantage while those associated with avoidance behaviors (e.g., sad) disadvantage memory. The current study was designed to identify if name learning success is influenced by the emotional valence associated with the learning context. Additionally, the relationship between the learner and the to-be-remembered individual was examined. Participants studied photographs and names of individuals that comprised a hypothetical group associated with either a happy, sad, angry, or neutral situation. In addition, they were instructed to imagine themselves or a friend being associated with the group. A recall test indicated that participants best remembered the names for faces presented within an approach emotion scenario, particularly when they were associated with the self. These results align with both the approach-avoidance hypothesis of emotion processing and self-reference effect of memory.

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12:00-1:30 PM (2082)

Search Patterns in Emotional Free Recall: How Do People Access Their Past Feelings? YING LI, Max Planck Institute for Human Development, THOMAS HILLS, University of Warwick (Sponsored by Thomas Hills) - How do we recall our own past emotions and how is this affected by how we feel? To answer these questions, we asked participants to complete the Emotional Recall Task (ERT) -- a recall-based affect measure that requires subjects to write 10 words to describe the feelings they had over the past month, followed by answering how often they experienced each of the emotions. We then modeled emotional recall using a representation of emotional space derived from free associations and computational models that searched over that space. Using model competition, we find search patterns are best described by models that incorporate semantic proximity between consecutive responses in combination with one's general affect (measured independently). Lexical frequency of emotions and experiential frequency failed to predict search patterns. Our analyses suggest that people use general affect as a cue to retrieve memories on experienced emotions, and therefore are more efficient when recalling affect-consistent emotions. Our results suggest that the ERT may be different from standard recognition-based emotion measures, and potentially capture better the emotions that come to people's minds in their day-to-day life.

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12:00-1:30 PM (2083)

Erasing Highly Negative Memories: Retroactive Interference Is Not Temporary. CODY J. HENSLEY, HAJIME OTANI, MONICA S. HAMAKER, and GAVIN T. ROUPE, Central Michigan University (Sponsored by Hajime Otani) -Emotionally negative memories are persistent and disruptive. Previously, we have shown that emotionally negative memories can be made inaccessible by creating retroactive interference (RI). The question is whether RI is temporary or long lasting. We presented a list of highly negative pictures (List 1) followed by an interference list (List 2) of highly negative, moderately negative, or neutral pictures. There was no List 2 for the control condition. A free recall test was administered 48 hours later with an instruction to recall both List 1 and List 2. We found that RI was present in all three interference conditions. Furthermore, RI was stronger when the moderately negative List 2 was presented three times than when the highly negative List 2 was presented once. Most importantly, RI was present after 48 hours indicating that forgetting of emotionally negative memories can be long lasting.

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12:00-1:30 PM (2084)

Valence Recognition Without Image Identification. DEANNE L. WESTERMAN, SAMIRA DODSON, REBECCA LURIE, and JOSEPH CLARENCE WILSON, Binghamton University, SUNY (Presented by Deanne Westerman) - Research using the recognition without identification paradigm (Peynircioglu, 1990, Cleary & Greene, 2000) has found that participants can discriminate between old and new stimuli even when the stimuli are obscured to a degree that they are unidentifiable. Cleary, Ryals & Nomi (2013) adapted this procedure by presenting images of threatening and non-threatening objects, obscured by visual noise. Participants were asked to identify and then rate the familiarity of each image. The results showed that among unidentified images threatening animate images were rated as the most familiar. The current study sought to replicate this finding using the same procedure and similar stimuli. Across three experiments, unidentified positive images were rated as more familiar than unidentified negative images. Although seemingly at odds with previously reported findings, the present results are consistent with theories that posit a strong link between feelings of positivity and the experience of familiarity.

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12:00-1:30 PM (2085)

Cultural Differences in Multisensory Perception of Emotion. PEIYAO CHEN, Northwestern University, TAOMEI T. GUO, Beijing Normal University, ALICE H.D. CHAN, Nanyang Technological University, VIORICA MARIAN, Northwestern University – Previous studies show that people from Western and East Asian cultures demonstrate different biases to the visual vs. auditory modality during multisensory emotion perception. In the present study, we investigated whether individuals from Western, East Asian, or both cultures show different biases depending on the culture of the input. Native English speakers in the U.S., native Chinese speakers in China, and Chinese-English bicultural bilinguals in Singapore were presented with facial expressions and emotional speech from both Eastern and Western cultures. We replicated the cultural difference in modality bias, where American participants showed a larger bias to the visual modality, and Chinese participants showed a larger bias to the auditory modality. Bicultural bilinguals showed a larger bias to the visual modality, which resembled the pattern observed among English speakers in the U.S. Further analyses revealed an increased bias to the auditory modality in bicultural bilinguals when responding to Eastern cultural input. These results suggest that the cultural background of the perceiver and the cultural context associated with the input can influence modality bias during multisensory emotion perception.

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12:00-1:30 PM (2086)

Are Reference Items and Implied Toward and Away Movements Necessary for Valence Modulation? ISIS CHONG and ROBERT W. PROCTOR, Purdue University (Sponsored by Kim-Phuong Vu) - Stimuli with positive valence (e.g., flowers) and negative valence (e.g., spiders) have been shown to modulate response selection when participants make overt approach or avoidance gestures. The present study sought to determine whether viewing reference items next to these non-neutral stimuli and their implied movement toward the critical stimuli is necessary for this modulation. Participants completed a spatial Simon task in which they responded to the valence of stimuli presented in left/right locations. Responses were made when a central reference human icon was absent, static, or moved depending on response direction. Similar to prior studies, results showed that responses were facilitated for positive stimuli mapped onto right keypress responses. The presence of the reference icon was found to slow responses compared to trials in which it was absent. Its implied movement, or lack thereof, did not affect valence modulation, suggesting that spatial relationships are a more critical determinant of modulation.

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12:00-1:30 PM (2087)

Search for the Developmental Turning Point in Perceptual-Attentional Processing in the Confusion Between Fear and Surprise: An Adolescent Study. ADÈLE GALLANT, MYLÈNE MICHAUD, and ANNIE ROY-CHARLAND, *Université de Moncton* (Sponsored by Annie Roy-Charland) – Roy-Charland et al. (2015) looked at viewing times and saccades, while participants were recognizing fear and surprise presented in pairs within 3-5, 9-11 years old and adults. They found that children 9-11 were as accurate as adults in recognizing the emotions and both groups were higher than the children 3-5. Interestingly, the two groups of children made fewer saccades between the pair of



faces and viewed the expressions longer. Thus, while accuracy is equal to adults by 9-11, visual processing differs. This project examines the perceptual-attentional processing of fear and surprise in adolescents (14-17) in search of a turning point in visual strategies used in the recognition task. Results suggest a *speed/accuracy trade-off.* In effect, adolescents were as fast as adults, but their accuracy was lower. Furthermore, adolescents made fewer saccades than adults, similar to 3-5 and 9-11 years old. These results add another piece in the understanding of the developmental trajectory of recognition of facial expressions. Email: Adèle Gallant, eag0327@umoncton.ca

12:00-1:30 PM (2088)

Mood Moderates the Effect of Aesthetic Appeal on Performance. IRENE REPPA, Swansea University Aesthetically appealing stimuli improve performance in demanding target localisation tasks compared to unappealing stimuli. To examine the possible underlying mechanism mediating the effects of appeal on performance, participants were put in a positive or negative mood prior to carrying out a visual target localisation task with appealing and unappealing targets. Positive mood initially led to faster localisation of appealing compared to unappealing stimuli, while an advantage for appealing over unappealing stimuli emerged over time in negative mood participants. The findings are compatible with the idea that appealing stimuli are inherently rewarding, with mood temporarily gating any rewarding effects that aesthetic appeal might have on performance. However, this gating by mood is temporary and aesthetic appeal can overcome the detrimental effects of negative mood on performance, and even help counteract the adverse effect of negative mood on performance.

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12:00-1:30 PM (2089)

Emotional Tension and the Visual Structure of Film. KACIE L. ARMSTRONG and JAMES E. CUTTING, Cornell University (Sponsored by James Cutting) - Through manipulation of the visual tools of cinema, filmmakers have increasingly cultivated a style of filmmaking that controls viewer gaze, facilitates the reading of characters' facial expressions, and promotes narrative engagement. This study investigates how they use the same tools (including luminance, motion, shot density, shot duration, shot scale, and sound amplitude) to influence emotional response among viewers. We asked participants to move a joystick to indicate their levels of emotional tension as they viewed a series of short films. We also collected physiological data (heart rate and galvanic skin response) to determine whether objective markers of emotional arousal map onto subjective measures. Analyses of these variables against the visual structure of each film suggest robust effects of shot density for animated films, shot scale for live action films, and sound amplitude for both formats. Additionally, low correlations among the three emotion variables may reflect a dissociation between measures of emotion that are comparatively more sensitive to narrative elements of film (e.g., joystick displacement) and those that are more sensitive to visual stimulation (e.g., heart rate). Email: Kacie L. Armstrong, kla78@cornell.edu

12:00-1:30 PM (2090)

The Influence of Facial Emotional Expression on Personal Trait Judgements: Does Viewing Negative Emotions Help with Labeling Negative Traits? JESSIE J. PEISSIG and AYLIN GANN, California State University, Fullerton - This study investigated the relationship between personal traits and facial emotional expressions. In this experiment, participants were first shown an emotional expression as a prime, then were asked to label whether personal traits, shown as words (e.g., loyal, phony), were positive or negative. The facial expressions themselves could be labeled as positive (e.g. happy) or negative (e.g., fear, sad, disgust). It was expected that there would be a performance benefit for those trials in which the emotional expression and the personal trait were congruent, compared to trials in which the expression and trait were incongruent. The results showed that for response times, confused, sad, and surprised expressions led to faster recognition of negative personal traits, and disgust, happy, and neutral expressions led to faster recognition of positive personal traits. For accuracy, showing a happy expression led to more accurate performance on positive traits, and negative expressions (confused, disgust, sad, surprised) led to higher accuracy for negative personal traits. These results suggest that there are congruency effects for the valence of the personal trait emotional expression. Email: Jessie J. Peissig, jpeissig@fullerton.edu

12:00-1:30 PM (2091)

Asymmetric Effects of Simple Image Features on Fear and Disgust. HIROMI SATO, SHIORI MURANAKA, WAKANA HATA, and ISAMU MOTOYOSHI, University of Tokyo -Negative emotions such as fear and disgust enable us to escape immediately from threats and dangers in the environment, which is essential for human survival. Although emotions are often thought to be brought about by higher order complex information such as context, some negative emotions may be directly driven by simple image features rapidly encoded in the early visual cortex. In this study, we examined how simple image features such as color, luminance and spatial frequency affect the emotional valence of natural scenes. The observers rated the fears and disgusts of 200 natural scenes, their achromatic versions, the RGB inverse versions and the high-pass filtered versions. Results showed that (1) removal of color information strongly reduced disgust, but not fear, (2) RGB inversion reduced disgust while increasing fear, and (3) removal of low spatial-frequency component increased disgust more than fear. That is, such image features had an asymmetric effect on fear and disgust. These results demonstrate the influence of simple image features on emotion and indicate a possibility that distinct visual pathways (e.g., Magno / Parvo streams) are involved in neural processing of fear and disgust. Email: Hiromi Sato, satou.hiromi@gmail.com

12:00-1:30 PM (2092)

The Effect of Emotional Words on the Perceptual Processing. SHIAU-HUA LIU, *National Dong-Hwa University* – Recent studies indicated that emotional expressions could facilitate the early perceptual information processing (Bocanegra, & Zeelenberg, 2009; Phelps, Ling, & Carrasco, 2006). Phelps et al. (2006) required observers to make an orientation judgment on tilted Gabor patches after a brief display of fearful or neutral faces. The results showed that fearful expressions can enhance the threshold contrast sensitivity. Therefore, they claimed that "emotion" can facilitate the perceptual processing. In this study, we employed emotional words (Chinese) and noise masking to explore if happy and fearful words can facilitate the perceptual processing? Whether the improvement from fearful words is different from that from happy ones? Does the facilitation occur under high-noise condition? From our results, we found the supporting evidence for emotional facilitation on performance no matter it is Fearful or Happy words condition and for both no noise and noise conditions.

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12:00-1:30 PM (2093)

The Effect of Cold Temperature on the Utilization of Statistical Knowledge in Decision Making. CAROLYN SMITH and TRAVIS RICKS, Bemidji State University - In the current study, we compared participants' decision making ability in a normal temperature room to a slightly cold room. The decision tasks included moral dilemma judgements, competitive/cooperative behavior, resource allocation, and driving decisions. We also examined how participants' statistical literacy, as measured by the Berlin Numeracy test, interacted with temperature and decision tasks. We did not find that temperature or statistical knowledge had an effect on moral decision making. However, we did observe that participants with more statistical literacy were more likely to take advantage of group members and take more resources than is fair, except in the cold room. It was also observed that those with more statistical knowledge were more likely to report driving faster in clear and safe conditions and decrease their speed in adverse driving conditions. These effects were altered when driving experience was taken into account. Email: Travis Ricks, travis.ricks@bemidjistate.edu

12:00-1:30 PM (2094)

Sampling Patterns in Information foraging: How Curiosity, Interest and Age Drive Information Sampling in a Text-Based Paradigm. GRETA MARIE FASTRICH, LILY FITZGIBBON, JOHNNY LAU, and KOU MURAYAMA, University of Reading - Interest and curiosity guide the way we choose information to learn. However, so far, little is known how these psychological processes help us switch between the exploration of different topics and whether this exploration differs between age groups. In this study, we gave visitors of the London Science Museum (N = 596; Age: 12 - 79) the opportunity to explore a topic of their choice (e.g. "Prehistoric Animals"). Here they could choose to sample information from different categories (e.g. different prehistoric animals). After reading each fact, they decided whether to gain more information about the same animal or to switch to a new animal. Participants rated their curiosity before the presentation of each fact and then rated their interest after reading the fact. The results showed that interest predicted the choice to continue with the same animal more strongly

than curiosity. Additionally, older adults tended to view more information from a single animal while younger people viewed more varied categories.

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12:00-1:30 PM (2095)

How Recalling Values from the Edges of the Distribution Supports Evaluation and Choice. ALICE MASON and ELLIOT LUDVIG, University of Warwick - Extreme events are often over-represented in memory. which can shift preferences for risky options. The relationship between memory and choice has previously only been examined using a limited set of outcomes. In a series of experiments, we asked participants to recall two-digit numbers sampled from a uniform distribution. People were more likely to recall numbers from the top and bottom edges of the distribution. This is consistent with previous findings that items near the edges of the distribution are overweighted in memory and choice. In a further experiment we tested the degree to which enhanced recall of near-extremes influenced risky choice. Each payoff was associated with a distribution of outcomes. This design enabled us to examine whether risky choice was driven by better memory for all items linked to extreme outcomes or only a subset of these items. Furthermore, by including a greater range of outcomes, we attempt to disentangle the degree to which people recall individual instances when making decisions under risk versus using samples from a distribution in memory.

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12:00-1:30 PM (2096)

Self-Control, Delay Discounting, and Apathy in Junior High School Students. MAMI TERAO, Senshu University, MICHIKO SORAMA, Kyoto Notre Dame University (Sponsored by Sadahiko Nakajima) - Self-control and impulsiveness can be quantified through delay discounting. In the previous research, change in delay discounting as a function of age was found with questionnaire measures in 12-20 -year-olds. The purpose of this study was to examine the relationship between delay discounting, apathy, and experience of effort (negative and positive experiences) in Japanese junior high school students. Participants' delay discounting rate, apathy, and experience of effort were measured using questionnaires. Delay discounting rate was measured under two different reward conditions of 80,000 yen now versus 130,000 yen delayed, and 80,000 yen now versus 520,000 yen delayed. As a result, there was a positive correlation between delay discounting rate and physical inadaptability in apathy. Participants who showed high delay discounting rate scored higher on measures of apathy. The results suggest the usefulness of the framework of delay discounting to understand the background of self-control in junior high school students.

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12:00-1:30 PM (2097)

The Dynamics of Decision Making During Goal Pursuit. TIMOTHY BALLARD and ANDREW NEAL, University of Queensland, SIMON FARRELL, University of Western Australia, ANDREW HEATHCOTE, University of

Tasmania - Whilst much is known about the intra-decision dynamics of single, one-shot decisions, less is known about how this process changes over time as people get closer to achieving a goal and/or as a deadline looms. We have developed an extended version of the linear ballistic accumulator model that accounts for the effects that the dynamics of goal pursuit exert on the decision process. Here, we present recent work that tests this model. Participants performed a random dot motion discrimination task in which they gained one point for correct responses and lost one point for incorrect responses. Their objective was to achieve a certain number of points within a certain timeframe. Results suggest that the decision threshold is sensitive to deadline, such that people prioritised speed over accuracy more strongly as the time remaining decreased. The decision process was also sensitive to the amount of progress that remained before the goal was achieved, the incentive for goal achievement, and the type of goal (approach vs avoidance). These findings illustrate the sensitivity of decision making to the higher order goals of the individual and provide an initial step towards a formal theory of how these higher-level dynamics play out. Email: Timothy Ballard, t.ballard@uq.edu.au

12:00-1:30 PM (2098)

Probability Tornado Warnings. CHAO QIN, University of Washington, SUSAN JOSLYN and SONIA SAVELLI, University of Washington, JULIE DEMUTH and REBECCA MORSS, National Center for Atmospheric Research, KEVIN ASH, University of Florida (Sponsored by Susan Joslyn) - The current polygon tornado warning format used by the National Weather Service is deterministic, without communicating uncertainty. Prior research suggests that numeric probability information in forecasts improves end-users' understanding, trust, and decision quality. However, the NWS believes that color-coded risk expressions are easier for the general public to understand despite little research to support this claim. Here we tested four probabilistic formats, two with color and two with numeric probabilities alone, comparing them to the polygon format. In a computerized task, participants decided whether to take shelter based on tornado warnings. Probabilistic formats led to better understanding of the likelihood of a tornado. However, color-coded formats led to overestimation of the likelihood, showed a spatial anchoring bias, and conflated likelihood and severity, comparing to numeric probability formats. Moreover, numeric probability formats had higher trust. Although there are benefits to color coded likelihood displays, they can give rise to some misunderstandings.

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12:00-1:30 PM (2099)

Nws Hazard Simplification: Comparing Protective Action Decisions Made to Legacy Watch and Warnings vs. Alternative Prototypes. MARK A. CASTEEL, *Penn State York* – The National Weather Service (NWS) has been undertaking a hazard simplification project the past few years designed to enhance and simplify the nature of the Watch, Warning, and Advisory messages they distribute. Potential changes to the warning headlines for severe weather watches and warnings were

recently examined, and a preliminary report released June 2018 found that alternative protype headlines may be more effective than the legacy "watch" and "warning" headlines currently in use. One limitation of those initial findings, however, is that the cautionary information following the headlines was not based on actual NWS warnings. The research reported here therefore represents an empirical investigation of the effectiveness of the legacy headline tornado watches and warnings, coupled with archived watches and warnings, compared to the same information paired with an alternative prototype headline. Participants read a series of tornado watches, later elevated to warnings, in both the legacy and prototype versions. Following each watch or warning, participants made decisions assessing risk and likelihood of taking protective action. Implications of the results will be discussed, and potential next steps will be offered.

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12:00-1:30 PM (2100)

The Attentional Drift Diffusion Model Uncovers Attentional Determinants of Probability Weighting. VERONIKA ZILKER and THORSTEN PACHUR, Max Planck Institute for Human Development (Sponsored by Thorsten Pachur) - Probability weighting is a key construct in cumulative prospect theory (CPT), which assumes that the impact of the possible outcomes of risky options follows from a nonlinear transformation of objective probabilities. The attentional drift diffusion model (aDDM) formalizes how biases in attention allocation during a sequential sampling process can affect preference construction. We demonstrate a link between probability weighting and attentional biases. We simulated choices between safe and risky options in the aDDM with varying option-specific attentional biases; the choices were then modeled with CPT. Attentional biases produced highly systematic signatures in CPT's weighting function. We also demonstrate this specific link between attentional biases and probability weighting in empirical data. This highlights that apparent distortions in the representation of probabilities assumed in CPT can be due to option-specific biases during the sequential sampling of outcomes. This suggests a novel attention-based explanation for empirical phenomena linked to characteristic shapes of CPT's weighting function (e.g., certainty effect, fourfold pattern, description-experience gap).

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12:00-1:30 PM (2101)

The Structure of Information Provision Affects Current and Future Decision Strategy Utilisation. QING HAN, CASIMIR J.H. LUDWIG, and SUSANNE QUADFLIEG, University of Bristol (Sponsored by Casimir Ludwig) – In decision problems with multiple cues of different validities, participants must determine to which extent they consider all available cues. Prior research on the topic has typically presented all cues in a fixed order of descending validities. This traditional order may itself influence cue utilisation. Therefore, we manipulated the order of cues in a "stock market" game and found that a traditional cue order prompted the optimal, weighted integration of cues (i.e. Weighted Additive Rule) more so than a random cue order. For participants who encountered the random structure first, the probability of strategy utilisation changed little when shifting to a fixed information structure. Participants who encountered the fixed structure first became less systematic when shifting to a random information structure. The results suggest that the utilisation of multiple cues depends not only on the structure of these cues but also on how this structure changes over time. Email: Qing Han, qh17843@bristol.ac.uk

12:00-1:30 PM (2102)

Information Sampling for Decisions from Finite Evidence. KARL M. KUNTZELMAN, University of Nebraska-Lincoln, JOSHUA E. ZOSKY, University of Nebraska-Lincoln, MICHAEL D. DODD, University of Nebraska-Lincoln - Human decision making has been well-characterized in situations where all evidence is immediately available (e.g., standard psychophysics tasks) and situations where evidence is serially available and delivered in a probabilistic manner (e.g., many gambling tasks). In many real-world situations, such as reading a scientific paper or news article, there is a finite and reviewable but not instantaneously available quantity of evidence available and sampling in service of an ultimate decision is limited only by an observer's willingness to continue. We use a novel card-flipping task to characterize human behavior in such a situation, where optimal performance can be variably defined as a function of a participant's investment in being correct (as opposed to finishing quickly and going for lunch). Deviations from optimal performance reveal idiosyncratic overweighting of evidence under various conditions.

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12:00-1:30 PM (2103)

How Goals Can Change People's Risk-Taking Behavior. JANA BIANCA JARECKI and JÖRG RIESKAMP, University of Basel (Sponsored by Jörg Rieskamp) - Goals can change people's choices under risk, with higher goals causing more risk/variance seeking behavior (known as risk-sensitivity). To examine the cognitive process underlying repeated risky choice with explicit goals we compare different formal models: First, we specify the optimal model plus noise as a benchmark (Houston & McNamara, 1988), which, however, appears psychologically implausible for its high computational complexity. Second, we test a modification of prospect theory incorporating a reference point that reflects the distance to the goal and time horizon. Third, we propose a risk-return model trading off expected returns against the chance to fall behind the goal per trial. To compare the models, we conducted an incentivized experiment in which participants (N=60) made repeated risky choices with explicit goals. The data show people's sensitiveness to goals in risky choices. Results from predictive cognitive model comparison revealed that the risk-return model best described human behavior. Our work shows that goals are important drivers of risk-taking, and the model results provide new insights for future theory advancement.

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12:00-1:30 PM (2104)

Situational Factors and Individual Traits Influence the Allocation of Attention During Risky Decision-Making: Evidence from Eye Tracking. SARA M. MILLIGAN and ELIZABETH R. SCHOTTER, University of South Florida (Sponsored by Elizabeth Schotter) - Risky decision making involves interactions between situational factors and traits of the decision-maker. We investigate how people allocate attention in risky situations and how the decision-making process varies based on characteristics of the decisions (i.e., level of risk, how much agency the person has over the outcome) and individuals (i.e., risk aversion). We use eye tracking (i.e., dwell time) to determine the relative amount of cognitive resources spent evaluating different types of information and find that people direct more attention to probabilities than potential payoffs and more attention to bad than good potential payoffs. However, in situations where people have agency in influencing the likelihood of the outcome, they give more equal attention to good and bad potential payoffs, especially those who are risk averse and in high risk situations. These findings suggest that personal traits influence not only the decisions that people make, but also the way in which they evaluate situational information.

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12:00-1:30 PM (2105)

Control Preference Persistency with Age. ERIC C.M. CHANTLAND, Michigan State University, KAINAN S. WANG and MAURICIO R. DELGADO, Rutgers University, SUSAN M. RAVIZZA, Michigan State University (Sponsored by Susan Ravizza) - Control is desirable as it allows targeting efforts to achieve the most beneficial outcome. Individuals will relinquish monetary reward in order to exercise control (Wang & Delgado, in press). While control is rewarding for young adults, control preference may change as we age. Adults older than 50 feel they have less control over their environment (Mirowsky & Ross 2007), but the affective value that control offers may be largely unaffected by age. The present study sought to determine how aging changes the desire for control using a task where choosing to obtain or relinquish control is associated with different levels of reward. Younger adults (mean age = 20) favored exercising control over relinquishing control often at the cost of monetary rewards. Older adults (mean age = 62) showed the same subjective value for control as younger adults. These findings imply that the affective value of control is likely maintained across age.

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12:00-1:30 PM (2106)

Age Differences in Framing Effects During Decision-Making. KAILEIGH A. BYRNE, *Clemson University* – The Selection, Optimization, and Compensation (SOC) model proposes that older adults can successfully respond to cognitive decline by adapting one's goals from a growth focus towards a maintenance or loss prevention focus, characterized by a heightened focus on preventing losing one's available resources as one ages. This study sought to extend the SOC model to the context of decision-making by examining how framing



effects modulate age-related differences in effort-based choices. Participants completed the Effort Expenditure for Rewards Task (EEfRT) in either a gain or loss context. The EEfRT is an effort-based decision-making paradigm in which participants choose between a low-effort, 'easy' task and a high-effort, 'hard' task for several trials. The probability and value of an outcome varies on every trial. The results demonstrated that older adults chose more high-effort, difficult tasks in loss frames than gain frames. Older adults also chose fewer low-effort, easy tasks than younger adults in gain contexts, but did not differ from younger adults in loss contexts. Consistent with the SOC model, older adults appear willing to incur a greater 'cost' in the form of effort to prevent a loss than to attain a reward. Email: Kaileigh A. Byrne, kaileib@clemson.edu

12:00-1:30 PM (2107) Altruistic Decision Making in Younger and Older Adults: A Meta-Analysis. ERIKA P. SPARROW, LIYANA T. SWIRSKY, and JULIA SPANIOL, Ryerson University - Aging is associated with a rise in altruistic decision making, but the mechanisms underlying this effect remain poorly understood. In particular, it is unclear whether altruism reflects increased access to resources or a shortened future time perspective in older adults. To shed light on this issue, the current meta-analysis synthesized results of studies using behavioral-economic paradigms in which altruism was measured in one-shot, non-reciprocal decisions (e.g., dictator game). Meta-analytic results across 16 comparisons of younger and older-adult groups (N = 1,581) confirmed that the age-related increase in altruism was reliable overall (g = .59, p < .001). Of several methodological, demographic, and socio-cultural moderators that were examined, the only significant moderator was the average age of the older sample, such that studies with "old-old" samples showed a smaller age difference in altruism compared to studies with "young-old" samples. This finding is consistent with a resource account of altruistic decision making, according to which altruism in old age is driven by resource availability (e.g., cognitive, affective, physical), rather than by age-related reductions in future time perspective.

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12:00-1:30 PM (2108)

Time and Cost Affect Exploration for Information in Decision-Making Under Uncertainty. DONG-YU YANG and DARRELL A. WORTHY, Texas A&M University (Sponsored by Darrell Worthy) - Exploring the environment for additional information is often of critical important in decision-making, but this additional information can sometimes cost time or money, and it's unclear how people value gaining new information. In the current study participants performed a four-choice binary outcome decision-making task where each option had a set probability, p, of giving a gain (+100), and a 1-p probability of giving a loss (-100). Participants could choose to explore on each trial and would see the outcome for all options but receive a set payoff that varied by group (either -5, or 0). One group of participants had 100 trials to perform their best in the task regardless of how many times they chose to explore, but another group of participants were informed the number

of remaining trials on each trial during the task. We found participants in the -5 group explored less than participants in the 0. Interestingly, participants in the trial-number informed group had less exploratory trials than in non-trial-number informed group across two types of payoff. This suggests that people place a value on exploring to gain additional information, and external factors can affect that value.

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12:00-1:30 PM (2109)

The Effects of Impulsivity and Socioeconomic Status on Delay Discounting Depend on Self-Construal. REBECCA B. WELDON, OLIVIA R. DRAKE, and ALESSANDRA N. FAMA, Juniata College - There are many reasons that humans have difficulty following through on long-term goals and instead favor smaller immediate rewards. The present study examined 1) how self-construal (thinking about oneself as independent or interdependent) affects delay discounting and 2) how different types of individualistic and collectivistic primes affect discounting. Participants (n=115) were recruited through Amazon Mechanical Turk and were randomly assigned to an individualistic or collectivistic prime before completing the Monetary Choice Questionnaire (Kirby et al., 1999) that involved a series of choices between a smaller immediate versus a larger delayed reward. Participants also completed the Barratt Impulsiveness Scale (Patton et al., 1995). There were no differences in discounting as a function of prime. When all participants were included in a regression analysis on choices for larger magnitudes of monetary rewards, impulsivity outpredicted socioeconomic status (SES). An ANOVA analysis revealed an interaction between prime type, impulsivity, and SES on choices for larger magnitudes of reward. These findings suggest that there are many variables that contribute to pursuing an immediate versus a delayed reward.

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12:00-1:30 PM (2110)

Would You Eat A Cricket? The Role of Curiosity in Willingness to Engage in Exploratory Eating Behavior. HANNAH JANE STONE, LILY FITZGIBBON, ELENA MILLAN, and KOU MURAYAMA, University of Reading (Sponsored by Kou Murayama) - Curiosity is considered an important driver of creative, novel, and exploratory behaviors (Gottlieb, Oudeyer, Lopes, & Baranes, 2013). Decisions to engage in novel behaviors are thought to be driven by the intrinsic reward associated with learning new information about the environment. Despite its intuitive appeal, this proposal has not yet been tested in an applied setting. In the current experiment, we investigated factors predicting people's willingness to try novel foods (containing insects) using a menu evaluation task. Participants (N= 242) rated pictures and short descriptions of insectbased foods and visually matched images of familiar foods on a number of factors including tastiness, attractiveness, and curiosity. Curiosity was a significant predictor of people's willingness to try novel insect foods above and beyond other predictors such as expected tastiness and attractiveness. Email: Hannah Jane Stone, hannah.stone@pgr.reading.ac.uk

12:00-1:30 PM (2111)

Mesostriatal Fiber Tract Integrity Predicts Impulsivity in Adolescents with ADHD. BLAKE L. ELLIOTT and KIMBERLEE D'ARDENNE, Arizona State University, JULIE B. SCHWEITZER, UC Davis MIND Institute, SAMUEL M. MCCLURE, Arizona State University (Sponsored by Gene Brewer) - Attention deficit hyperactivity disorder (ADHD), one of the most common developmental disorders, is characterized by inappropriate levels of impulsivity thought to be driven by deficits in the dopaminergic reward system. Few studies have examined how the structure of the dopamine system might relate to ADHD. We investigated structural connectivity between the midbrain (VTA/SN), where the dopamine neurons are located, and the striatum (e.g., mesostriatal pathway). We collected diffusion tensor imaging (DTI) data, self-report and task-based behavioral measures of impulsivity from a large number of ADHD and typically developing (TD) adolescents (n=159). We quantitatively mapped mesostriatal pathways with endpoints in the midbrain VTA/SN and striatum using probabilistic tractography. The ADHD adolescents differed from TD adolescents on all behavioral measures of impulsivity. ADHD adolescents also had stronger structural connectivity between the VTA/SN and striatum, and the strength of the mesostriatal pathways correlated with behavioral measures of impulsivity. The structural connectivity of mesostriatal pathways was disrupted in adolescents with ADHD, which might contribute to the behavioral manifestations of impulsivity. Email: Blake L. Elliott, blelliot@asu.edu

12:00-1:30 PM (2112)

A Gender Gap in Math-Specific Effort Avoidance. JALISHA BRAXTON JENIFER and KYOUNG WHAN CHOE, University of Chicago, CHRISTOPHER S. ROZEK, Stanford University, MARC G. BERMAN, University of Chicago, SIAN L. BEILOCK, Barnard College, Columbia University (Sponsored by Sian Beilock) - Previous research reports that females are more likely to hold negative attitudes towards math compared to males, which may account for the underrepresentation of females in STEM fields. However, little empirical work has explored gender differences in math avoidance behavior. Here, we measured the avoidance behavior of 163 female and 165 male participants online in an effort-based decision-making task where they chose between solving easy, low-reward problems and hard, high-reward problems in both math and non-math contexts. Females were more likely than males to select easier, low-reward problems over harder, high-reward problems in the math condition [F(1, 326)=12.0, p <.001], but not in the word condition [F(1, 326)=1.04, p=.31], even after controlling for math anxiety and math performance. These findings suggest that intervening on math effort avoidance may help increase female engagement in STEM.

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12:00-1:30 PM (2113)

The Association Between Pathological Smartphone Use and Feedback Processing. ROBERT WEST, AHSLEY DAPORE, CARL ASH, and KAITLYN MALLEY, *DePauw University* – Smartphones have become a ubiquitous part of everyday life, allowing us to keep in touch with friends and family, stay up to date on current events, and fill our leisure time. The proliferation of smartphones has been accompanied by a rise in the pathological use of these devices. Here we examine the relationship between pathological smartphone use and the neural correlates of feedback processing in a modified 2-doors gambling task. The amplitude of the FN was insensitive to pathology, while the amplitude of the frontal P3 decreased as pathology increased; the amplitude of the reward positivity also decreased as pathology increased. Our data reveal a dissociation in the relationship between pathological smartphone use and feedback processing, wherein the ERPs for gains were generally attenuated in high pathology individuals, while the ERPs for losses were only sensitive to pathology when the participant was the agent of the choice.

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12:00-1:30 PM (2114)

Evaluation of an Action's Effectiveness by the Motor System in a Dynamic Environment. EITAN HEMED (Graduate Travel Award Recipient), SHIREL BAKBANI-ELKAYAM, ANDREI TEODORESCU, LILACH YONA, and BARUCH EITAM, University of Haifa (Sponsored by Baruch Eitam) - An important model for explaining humans' feeling of agency - the 'Comparator model'- draws on ideas used to explain effective motor control. The model describes how our brain estimates the degree of control over the environment that is offered by a specific motor program. However, given its current level of specification, the model is vague on how the prediction of effectiveness of an action is dynamically updated. Our participants performed multiple experimental blocks of a task reliably shown to measure reinforcement from effectiveness in which blocks with and without action-effects were interlaced. This design creates a sinusoidal-like objective increase or decrease in effectiveness (quantified as the n-trials back probability of receiving feedback), which participants were unable to report. As in previous studies, response speed indexed reinforcement from effectiveness. The results show that reinforcement is sensitive to both the degree and 'trend' of effectiveness - increases, decreases or plateau. The results are the first to show an 'online', dynamic and complex sensitivity to a motor-programs' effectiveness that is directly translated to its production.

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12:00-1:30 PM (2115)

Cross-Linguistic Trends in Speech Errors: An Analysis of Sub-Lexical Errors in Sfused Cantonese 1.0. JOHN ALDERETE, *Simon Fraser University* – Speech errors have been an important source of evidence for studying language production processes, but there are few observational studies with large numbers of natural speech errors, and even fewer from under-studied languages. We address this issue by analyzing a large collection of speech errors from natural conversations in Cantonese. In particular, we examine a set of roughly 1,500 sub-lexical errors involving permutations of sounds (i.e., substitutions, additions, deletions of consonants and vowels) with the aim of investigating known psychological biases in production processes. These biases include patterns traditionally used to support interactive spreading in production (frequency bias, lexical bias, similarity of intended and intruder sounds, mixed errors, repeated phoneme effect), grammatical forces (lack of phonotactic violations, planning units, syllable position constraint), and other patterns like the word-onset effect. The larger analysis supports cross-linguistic trends in language production and establishes unique contributions from the linguistic structure of Cantonese.

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12:00-1:30 PM (2116)

Stroop Effects Without Response Discrimination: The Effect of Color Congruency in a Go/No-Go Task. RENE ZEELENBERG and DIANE PECHER, Erasmus University Rotterdam, LUDOVIC FERRAND, Université Clermont Auvergne, CNRS, LAPSCO - Studies have shown that the stimulus-response compatibility effects, such as the Simon effect are eliminated in a go/no-go task in which participants respond to one stimulus characteristic (e.g., respond to a red disc, but not to a blue disc) using one response. Similar findings have been obtained for object-based action compatibility effects such as spatial alignment effect and grasp compatibility effect. These findings indicate that the Simon effect and related effects are present only when participants need to discriminate between different response alternatives. In a series of experiments, we tested the hypothesis that the Stroop effect would still be present even when participants do not need to discriminate between different alternative responses. Using forced-reading procedures we found evidence for a Stroop effect (faster mean reaction time in the color-congruent condition than in the color-incongruent condition). The presence of a Stroop effect in a go/no-go task is likely due to the stimulus-stimulus (semantic) conflict that is inherent to the Stroop task.

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12:00-1:30 PM (2117)

Does Linguistic Alignment Aid Production or Comprehension? RACHEL OSTRAND, IBM Research, EMMA GUARINI, Yorktown High School (Presented by Rachel Ostrand) - Speakers learn the words a partner uses to describe particular objects and then reuse those words when describing those objects back, leading to lexical alignment. This process is ubiquitous and unconscious. However, tracking linguistic input imposes memory and attentional demands during language comprehension and production; therefore, alignment must convey some benefit to interlocutors or it would not occur. Two experiments investigated the communicative benefits of lexical alignment. Subjects interacted with an experimenter to describe pictures with two acceptable names, one more commonly produced ("couch") and one less commonly produced ("sofa"). The experimenter first named a set of pictures, always using the less common names; then the subject named the same pictures back. Alignment was measured as whether the subject produced the same name as the experimenter for each picture. In different conditions, either the subject or the experimenter was under memory load while performing either the comprehension (matching) or production (directing) component of the task or

was under no load. Degree of alignment varied as a function of memory load, suggesting differential benefits of alignment for speech production and comprehension.

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12:00-1:30 PM (2118)

A Little Less Talk, a Little More Listening. ANDREW J. GUYDISH, TREVOR D'ARCEY, KRIS LIU, and JEAN E. FOX TREE, University of California, Santa Cruz (Sponsored by Jean Fox Tree) - We tested how imbalances in conversation brought on by task demands related to conversational reciprocity. Pairs of participants identified public art via phone communication. One member of the pair, the director, was stationary in the lab with a map and the other, the follower, walked around a small town looking for particular pieces of public art. Later, raters coded each conversational turn as either task-related or chitchat. As has been observed in similar prior studies, directors spoke more in task-related portions of the dialogue. What we newly observed is that directors spoke less in chit-chat portions. Similarly, directors used a greater number of words per turn during task-related communication while followers used a greater number of words per turn during chit chat. We believe the pattern reflects the desire for balancing reciprocity across the conversation as a whole.

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12:00-1:30 PM (2119)

Longer Exposure to English as L2 Increased the Salience of Phonological Units in Chinese-English Bilinguals' L1 Spoken Word Production. JIE WANG, Education University of Hong Kong, ANDUS WING-KUEN WONG, City University of Hong Kong, HSUAN-CHIH CHEN, Chinese University of Hong Kong - The influence of L2 experience on L1 spoken word production was examined with the picture-word interference paradigm, in which Chinese-English participants were required to say aloud the predesignated L1 name of a picture (i.e., the target) presented on a computer screen while ignoring a written L1 character (i.e., the distractor) superimposed on the picture. The target shared a certain phonological component with the distractor in the related condition and did not in the unrelated condition. The difference in naming latency between these two conditions was taken as the effect of the phonological relatedness, suggesting the extent of functional engagement of the shared phonological component in planning L1 spoken word production. Two types of phonological relatedness (i.e., syllable, rhyme) were included, and we examined the potential influence of L2 speaking proficiency, age of acquisition of L2, and years of use of L2 on the syllable effect and the rhyme effect respectively. Data of 193 Chinese-English bilinguals showed that both effects increased in L1 spoken word production as their years of use of L2 increased, indicating the potential influence of using an alphabetic language as L2 on speaking a non-alphabetic L1.

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12:00-1:30 PM (2120)

Contribution of Executive Functions to Language Production in Older Adults. HAOYUN ZHANG and MICHELE T. DIAZ, Pennsylvania State University (Sponsored by Michele Diaz) - Older adults typically show decline in language production compared to younger adults. This project investigated how individual differences in executive functions in older adults contribute to language production. Thirty-three older adults (56-79 years old) were tested on three aspects of executive functions (shifting, inhibitory control, working memory) using a Task Switching Task, an AX-CPT, and an Operational Span Task. To measure language production, three different tasks were also used (picture naming, verbal fluency, and story elicitation). These language tasks measured both linguistic and executive aspects of language processing. As shown from simple linear regressions and the multivariate canonical correlation analysis, older adults who had enhanced inhibitory control showed enhanced language production ability, as reflected by a more complex and fluent speech in story elicitation and more switches between clusters in verbal fluency. Additionally, an exploratory factor analysis suggested that better cognitive control, in general, may contribute to enhanced language production ability.

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12:00-1:30 PM (2121)

Gifted Children and Written Language Difficulties: A Study of Event-Related Brain Potentials and Written Performance. LUCILE CHANQUOY, SOPHIE GUETAT, and MARIE-NOËLE MAGNIÉ MAURO, Université Côte d'Azur - This experiment was carried out to test the following hypotheses: (1) the sensitivity of the left hemisphere to semantic cooccurrences (Gross-Fifer & Deacons, 2004) could be extended to orthographic co-occurrences and (2) an over-investment of the right hemisphere, frequently found in gifted children (Alexander, O'Boyle, & Benbow, 1996; Magnié, Caro, & Faure, 2003) - which would prevent orthographic co-occurrence priming (normally support by the left hemisphere) -, should cause surface dyslexia-associated symptoms to (surface type) in those children. To test our hypotheses, 6 groups of children (4 groups aged 8 to 11 years, gifted or non, and with or without dyslexia and 2 younger groups of children, matched in reading level with dyslexic children) performed a word-likeness task. Participants had to determine which of the pseudo-words (whose likelihood of letter concatenation was manipulated) looked like a word that could be derived from the French language. Results are being analyzed.

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12:00-1:30 PM (2122)

Acquiring Orthography Impacts the Phonological Encoding Processes in a Picture Naming Task. MASAHIRO YOSHIHARA, Waseda University, MARIKO NAKAYAMA, Tohoku University, YASUSHI HINO, Waseda University – Many previous priming studies showed that prime-target pairs sharing the initial phonological segments produce facilitation effects in word production tasks (e.g., MOPE). Using Japanese stimuli, Yoshihara et al. (2017) reported that priming patterns were different for kanji and kana, suggesting the possibility that orthography has an impact on the phonological encoding processes. In order to further examine this possibility, we asked participants to memorize novel spoken words along with novel pictures over 4 successive days. On the third day, the orthographic forms of the words (in kanji) were introduced to them. Masked priming picture naming tasks were conducted before and after the learning of the orthographic forms. Masked kanji primes yielded significant priming only after the participants learned the orthographic form of the novel words. No priming was observed for kana primes. We discuss how the acquisition of orthographic representations affects the phonological encoding processes.

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12:00-1:30 PM (2123)

Electrophysiological Signatures of Error Prevention During Language Production. ANNE-SOPHIE DUBARRY and ELIN RUNNQVIST, Aix Marseille University, CNRS, LPL, CRISTINA BAUS, Universitat Pompeu Fabra, F. XAVIER ALARIO, Aix Marseille University, CNRS, LPC (Presented by A. Sophie Dubarry) - We tested whether error-prevention in language production shares processes with general action control through internal modeling, whereby the sensory outcome of actions is predicted before they take place. Modulations of the electroencephalographic N100 component have been taken to index internal modeling of self-initiated sounds, including speech. To investigate the role of internal modeling beyond sensory-motor aspects of language production, we assessed the sensitivity of the N100 to lexicality, a variable known to impact monitoring. Lexical errors are harder to intercept than nonlexical errors, indicating a difference in monitoring load between lexical and non-lexical competitors during language production. Participants were primed to make lexical or non-lexical errors in a word production task. When participants successfully avoided making errors (correct trials), we observed more negative N100 mean amplitudes for lexical error priming. Results are discussed in light of different models of language production and monitoring.

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12:00-1:30 PM (2124)

Nuclear Vowel Priming and Anticipatory Oral Postures: Evidence for Parallel Phonological Planning? PETER A. KRAUSE (Graduate Travel Award Recipient) and ALAN H. KAWAMOTO, University of California, Santa Cruz (Sponsored by Alan Kawamoto) - Linguistic and psycholinguistic theories of speech planning typically assume serial phonological encoding. However, under some neurally-inspired speech models, phonological elements are initially co-active in a parallel planning space. Previous research based on acoustic reaction times has mistakenly attributed execution-level phonetic effects to serial encoding. We used motion-tracked digital video to measure lip posture. In two form-preparation experiments, participants were sometimes primed with the nuclear vowels of CVC words. All words contained either /i/ (spread lips; e.g., "seed") or /u/ (rounded lips, e.g., "soup"). The initial consonant was always uncertain. Analyses emphasized oral postures just before stimulus presentation. In Experiment 1, participants' anticipatory postures were consistent with the upcoming vowel in the homogeneous context but not the heterogeneous one. Experiment 2 included two pairs of vowel-homogeneous blocks. The words of one /i/-block began with consonants requiring rounded lips. Primed vowels influenced anticipatory articulation *except* when superseded by conflicting demands from likely initial consonants. We will discuss the implications for parallel encoding models.

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12:00-1:30 PM (2125)

Do People Structure Sentences and Words Using Shared Mechanisms? SIN HANG LAU and VICTOR S. FERREIRA, University of California, San Diego, SHOTA MOMMA, University of Massachusetts, Amherst - The same sequence of linguistic units can be structured differently: Relative clauses in sentences such as "I met the students of the teacher who played the violin" can either have a high- (i.e., the students played the violin) or low-attachment reading (i.e., the teacher played the violin). Similarly, "social psychologist" can have either a high- (i.e., someone who studies social psychology; [[social psycholog(y)][ist]]) or low-attachment reading (i.e., a psychologist who is social; [[social][[psycholog(y)][ist]]]). Thus, abstractly at least, sentences and words have similar internal hierarchical structures. Using a structural priming paradigm, we investigated whether shared mechanisms process the internal structures of both sentences and words, despite the difference in grain size. Results showed that participants produced more high-attachment sentences following high- than lowattachment sentence primes; but participants produced highand low-attachment sentences equally following morphological high- versus low-attachment primes. We suggest that at least as reflected by structural priming, structural operations are not shared across morphological and syntactic levels. Email: Sin Hang Lau, aubreylau@ucsd.edu

12:00-1:30 PM (2126)

Challenges for Accounts of Semantic Interference in Production. PADRAIG O'SEAGHDHA, CHANNING EVERIDGE, ALMUT HUPBACH, and JEFFREY HEFLIN, Lehigh University - Two multi-phase picture naming experiments underline continuing puzzles concerning the fundamental nature of semantic interference in concept retrieval. Contrary to expectation, we found strong cumulative interference for thematic as well as for categorical relations in continuous name generation. Second, we found that the accrued interference costs carried over to all conditions in a following cyclic naming phase. However, interference in this phase was noncumulative and was much stronger for categorical relations. These results support the view that interference in cyclic naming and in continuous generation are distinct. Further strengthening this conclusion, a second continuous generation phase following cyclic naming showed renewed cumulative interference but no distinct carry-over effects of specific previous experiences. We conclude a) that semantic interference in cyclic naming of small

sets of related pictures does not engage incremental learning and b) that the basis of cumulative interference in continuous naming is underspecified.

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12:00-1:30 PM (2127)

Visual Word Recognition in L2 Japanese for Chinese-Japanese **Bilinguals: Does Phonological Similarity Modulate Cognate** Priming Effects in a Naming Task? CHUXIN LIU and JESSIE WANNERKAWAHARA, Tohoku University, MASAHIRO YOSHIHARA, Waseda University, STEPHEN J. LUPKER, University of Western Ontario, MARIKO NAKAYAMA, Tohoku University - Previous bilingual studies using cognates have typically shown an added benefit of phonological similarity (i.e., beyond that of orthographic similarity) in L2 visual word recognition (Dijkstra et al., 2010; Nakayama et al., 2014; Voga & Grainger, 2007). Using a masked priming naming task, we investigated the effects of phonological similarity on cognate translation priming in two logographic script languages, Chinese and Japanese. For Chinese-Japanese bilinguals, the priming effects were statistically/numerically equivalent for phonologically similar cognates (e.g., 心理 /xīnlǐ/ and / shiNri/) and dissimilar cognates (e.g., 保障 /bǎozhàng/ and / hoshoR/), although phonologically similar targets were named significantly faster overall. Our results indicate that phonology is not involved in Chinese-Japanese cognate translation priming effects even in a naming task. The faster naming latency for phonologically similar targets likely reflects a later process in which phonology is assigned to targets for the purpose of naming.

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12:00-1:30 PM (2128)

Phonological Network Fluency: Complex Search Through the Human Mental Lexicon. KARL DAVID NEERGAARD, Hong Kong Polytechnic University, JIN LUO, University of Groningen, CHU-REN HUANG, Hong Kong Polytechnic University - We investigated network principles underlying mental search through a novel phonological verbal fluency task. Post exclusion, 96 native-language (L1) Mandarin speakers produced as many items that differed by a single phoneme as possible within one minute. Their verbal productions were assessed according to several novel graded fluency measures, and network science measures that accounted for the structure, cohesion and interconnectedness of lexical items. A multivariate regression analysis of our participants' language backgrounds included their mono- or multi-lingual status, English proficiency, and fluency in other Chinese languages (Num_Chinese). The significant multilingual disadvantage in fluency is explained in terms of a decline in L1 frequency of use due to immersion-like conditions. Higher English proficiency predicted lower error rates and greater interconnectedness, while higher Num_Chinese revealed lower successive similarity and lower network coherence. This inverse relationship between English and Num_Chinese provides evidence of a restructuring of the phonological mental lexicon.

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12:00-1:30 PM (2129)

Shifts in the Production Effect in Children Aged 2 to 6 Years. TANIA ZAMUNER, BELEN LOPEZ, and MARIANNE ROUSSEL, University of Ottawa - Studies with adults and children have demonstrated that producing words during training benefits later recall and recognition of items, compared to items that are heard-only. Studies have also found that in certain instances, the production effect is reversed or attenuated. No work has addressed this from a developmental approach and no studies have been done with children under 5 years of age. This research investigates the production effect with children aged 2 to 6 years of age (n=150). Children were trained on familiar words which were either seen, heard or produced. Children were then tested on their recall for the trained words. Results indicated a developmental shift in the direction of the production effect: while older children recalled more words that were produced during training, the opposite pattern was found with younger children, who recalled more words that were heard during training. Our results fit into a growing literature that shows that the effects of production are subject to task-, attentional-, linguistic- and experience-related factors. Email: Tania Zamuner, tzamuner@uottawa.ca

12:00-1:30 PM (2130)

Laboratory Phonology Approaches to the Scientific Study of Reading. SARAH T. IRONS and SIMON J. FISCHER-BAUM, Rice University (Sponsored by Simon Fischer-Baum) -Laboratory phonology can be used to evaluate how competition at early levels of representation in a cognitive system cascade to impact articulation (Goldrick & Blumstein, 2006). The present study examines irregular words read aloud, to evaluate how cascading activation from competing lexical and sublexical phonological plans affect articulation in the DRC model of reading. Previous work from our lab found no evidence for this competition cascading to articulation (Irons & Fischer-Baum, 2018). In this work, we evaluate one possible explanation for the previous null finding: the sublexical effect on articulation is too small to be measured. In order to increase the sublexical contribution, we use an attentional control priming methodology (Zevin & Balota, 2000). Priming participants with nonword items biases their cognitive system toward utilization of the sublexical process, therefore increasing the impact of the sublexical process on articulation if competition cascades to articulation.

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12:00-1:30 PM (2131)

Cognitive Control in Error Production: Using Pupillometry to Measure Cognitive Effort in Slips-Of-The-Tongue. JULIE BANNON, SCOTT WATTER, STEFANIA CERISANO, and KARIN R. HUMPHREYS, *McMaster University* (Sponsored by Karin Humphreys) – Cognitive control has been widely studied in relation to various psychological processes. However, little is known about how this mechanism supports the production of error-free speech. While speakers are generally able to produce error-free speech with ease, mistakes do happen at least some of the time. In the current study, we use measures of pupil dilation to examine whether the production of speech errors results from difficulty organizing phonological segments into their appropriate word forms due to a lapse in control in the language system. Participants completed the SLIPS procedure to induce slips-of-the-tongue while their pupil dilation was measured. In addition, brain responses were measured using EEG. Preliminary results show that pupil dilation increases when speakers make an error, suggesting that speech errors occur when speakers lose control of the system, resulting in increased effort to produce words. These results contribute to a growing body of evidence that producing errors is an effortful process that results from difficulty in conflict monitoring in the language system.

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12:00-1:30 PM (2132)

Influence of Cognitive Load on Tone Perception in Cantonese. KIT YING CHAN and CHIA YAO LEE, City University of Hong Kong (Presented by Kit Ying Chan) - This study investigated the influence of cognitive load on tone perception in Cantonese. Thirty native Cantonese speakers completed the four-interval oddity task requiring tonal discrimination of Cantonese syllables with either lexical entry or not. Different cognitive loads were induced by a concurrent face recognition task with either earlier (early load) or simultaneous (late load) onset of visual stimuli with the auditory stimuli. In the no load condition, participants were asked to ignore the faces and no impairment was found on tonal discrimination of word or nonword stimuli. This aligns with previous findings that native tonal language speakers were able to generalize their tonal discrimination ability to nonlexical tones. Tonal discrimination involving nonword stimuli was significantly impaired in early and late load conditions with more severe impairment in the late load condition. Cognitive load had no significant impairment on the word stimuli. These suggest imprecise tonal encoding and greater reliance on lexical knowledge (lexical drift) for tonal discrimination under cognitive load. Results are discussed in light of auditory processing of pitch and categorical perception of lexical tones in tonal language speakers.

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12:00-1:30 PM (2133)

Effortful Listening in Older Adults: Examining the Relationship Between Pupil Response Dynamics and the Experience of Listening-Related Effort and Fatigue. RONAN MCGARRIGLE, LYNDON RAKUSEN, and SVEN MATTYS, University of York - Effortful listening and fatigue are common complaints from individuals suffering with age-related declines in hearing and/or cognition. In recent years, pupillometry has emerged as a possible objective tool for measuring the mental effort associated with listening in adverse conditions (Zekveld, Koelewijn, & Kramer, 2018). However, the precise relationship between changes in the task-evoked pupil response (TEPR) and the subjective experience of listening-related effort and fatigue remains unclear. Data from three experiments are presented that seek to examine the relationship between TEPR and perceived effort and fatigue in young versus older adults. Experiment 1 suggests that a more adverse signal-to-noise ratio results in both larger TEPRs and increased self-report effort and fatigue ratings



in young adults. Data from Experiments 2 and 3 are designed to examine relationships between TEPR, perceived fatigue, and speech perception in ageing listeners. Theoretical implications of the data with regard to the Framework for Understanding Effortful Listening ('FUEL') model will be discussed. Email: Ronan McGarrigle, ronan.mcgarrigle@york.ac.uk

12:00-1:30 PM (2134)

Recognizing Foreign-Accented Speech in Noise: Disentangling the Effects of Talker Intelligibility, Linguistic Complexity and Prosodic Structure Realization. DORINA STRORI, PAMELA SOUZA, and ANN R. BRADLOW, Northwestern University - In several sentence-in-noise recognition experiments, listeners transcribed simple (monoclausal, declarative) and complex (multi-clausal, hierarchicallystructured) sentences by three talkers: one native, one high and one low intelligibility L2 English speaker. As anticipated, recognition accuracy dropped with decreasing talker intelligibility and signal-to-noise ratio. Interestingly, increasing linguistic complexity reduced accuracy only for the native and high intelligibility talkers, a pattern that was replicated across two different sets of talkers. We tested the possibility that these results are driven by proficiency-related variation in syntactically-driven prosodic structure realization, by flattening the F0 contour of the sentences. Preliminary analysis revealed the same pattern of findings as in the previous experiments, suggesting that even without pitch cues to complex sentence structure, the native and high intelligibility L2 talkers evoke a linguistically sophisticated listening strategy. In contrast, for the low intelligibly L2 talkers, listeners show no evidence of recognition of hierarchical syntactic structure when presented with complex sentences. [Work supported by Knowles Hearing Center and NIH.]

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12:00-1:30 PM (2135)

Faces Can Trick Your Ears: Speaker Identity Affects Native-Accented but Not Foreign-Accented Speech. JANET G. VAN HELL, CARLY A. DANIELSON, and CARLA B. FERNANDEZ, Pennsylvania State University (Presented by Janet Van Hell) - Research shows that native-accented speech is easier to comprehend than foreign-accented speech. Most studies presented speech in isolation. We examined how faces cuing the speaker's ethnicity create expectations about upcoming speech, and how this impacts the comprehension of American- and Chinese-accented English. Caucasian American monolinguals listened to American-accented and Chinese-accented sentences, preceded by a picture of an Asian face or a Caucasian face, yielding two congruent face-accent conditions (Caucasian face/American accent; Asian face/ Chinese accent) and two incongruent face-accent conditions (Asian face/American-accent; Caucasian face/Chinese-accent). Immediately after hearing the sentence, listeners transcribed the sentence. For American-accented sentences, transcription accuracy was lower when preceded by an Asian face than by a Caucasian face. For Chinese-accented sentences, transcription accuracy did not differ for Caucasian and Asian faces. This indicates that faces cuing ethnicity only trick our ears in nativeaccented, but not in foreign-accented speech. Results will be discussed in terms of reverse linguistic stereotyping and accentdriven asymmetries in face-accent processing. Email: Janet G. Van Hell, jgv3@psu.edu

12:00-1:30 PM (2136)

A Modulating Circle Reduces Listening Effort and May Improve Speech Intelligibility for Older Adults. VIOLET A. BROWN, Washington University in St. Louis, JULIA F. STRAND, Carleton College, KRISTIN J. VAN ENGEN, Washington University in St. Louis (Sponsored by Kristin Van Engen) - Speech recognition in background noise is improved when the listener can see as well as hear the talker. However, it is not clear which specific features of the visual signal benefit recognition and which decrease (or increase) listening effort. A recent study demonstrated that temporal features of the visual signal alone are insufficient to improve speech intelligibility (Strand, Brown, & Barbour, 2018), but substantially reduce effort as measured using a dual-task paradigm. Given that the previous study was conducted on young adults, the current study aimed to assess whether these findings extend to a population of older adults. We found that reaction times to a secondary task were substantially faster when participants viewed the modulating circle, replicating Strand and colleagues' findings in older adults, and also found modest improvements in intelligibility when participants viewed the circle relative to audio-only presentation. These results suggest that a visual stimulus other than a talking face can reduce listening effort and may improve intelligibility for older adults, for whom speech recognition in background noise is particularly difficult. Email: Violet A. Brown, violet.brown@wustl.edu

12:00-1:30 PM (2137)

The Role of Articulation in Acquiring New Speech Sounds: A Multivariate Fmri Study. DAVID SALTZMAN and EMILY MYERS, University of Connecticut - During language acquisition, listeners must take variable acoustic input and separate it into distinct phonetic categories. One mechanism listeners could use is to extract articulatory information present in the speech signal (Liberman & Mattingly, 1985). A similar concept is instantiated biologically in the Dual Stream Model (Hickock & Poeppel, 2007); when listeners encounter an unfamiliar speech sound, they form a sensorymotor representation of that sound that recruits speech-motor regions. Our study asked whether novel speech sounds that could be articulated (an unfamiliar vowel contrast) recruited articulatory regions more than matched non-speech sounds (sinewave speech (SWS) analogues of the same sounds). Participants were trained to categorize both sound types and reached similar accuracy for each. Multivariate fMRI results showed that left MTG, left Insula, and right SMA contained patterns that discriminated speech, but not SWS tokens, providing limited evidence for the involvement of speechmotor regions during speech sound acquisition. Email: David Saltzman, David.Saltzman@uconn.edu

12:00-1:30 PM (2138)

Adapting to Foreign-Accented Speech After a Brief Intervention. JEANNE CHAROY, CHIKAKO TAKAHASHI, MARIE HUFFMAN, JEAN HENDRICKSON, and SUSAN E. BRENNAN, Stony Brook University - Foreign-accented speech can impair listeners' comprehension, causing them to miss (or misidentify) words. This presents a particular challenge in U.S. higher education, where many international graduate students serve as teaching assistants (ITAs) in undergraduate courses. We used a shadowing task to test the on-line comprehension of Mandarin-accented English by monolingual Englishspeaking students, along with a short script-based intervention to familiarize the students with the ITA's accent. Students were exposed to seven brief, meaningful stories recorded by an ITA (3X: shadowing while first hearing the story, listening silently while viewing a script, shadowing again). Each story included multiple instances of features identified as problematic for Mandarin-accented English (e.g., /th/, /v/-/w/ ambiguity, consonant clusters). Initial shadowing improved over stories, suggesting that a short intervention at the beginning of a semester might be a viable way to help native English speakers adjust to accented speech and be better able to follow a lecture. Email: Susan E. Brennan, susan.brennan@stonybrook.edu

12:00-1:30 PM (2139)

Examining Taboo Effects in Spoken Word Recognition in Native and Non-Native Speakers of American English. SAMANTHA E. TUFT, Cleveland State University, RACHEL B. FERNANDES, University at Albany, SUNY, SARA INCERA, Eastern Kentucky University, CONOR T. MCLENNAN, Cleveland State University - Bilingual speakers have self-reported experiencing less emotion when using their second language (Pavlenko, 2004). However, studies using objective measures, such as a visual emotional lexical decision task, have provided inconsistent results, with some studies obtaining no significant differences between the first and second language (Ponari et al., 2015) - and other studies reporting a weaker (Conrad, Recio, & Jacobs, 2011) or delayed (Opitz & Degner, 2012) effect in the second language. In the present study, we used computer mouse tracking in an auditory lexical decision task to examine the effects of taboo words compared to neutral words in native and non-native speakers of American English. We obtained an equivalent taboo effect for native and non-native participants in reaction time. However, in mouse trajectories, the taboo effect was larger for native participants. Overall, these results suggest that conflicting findings in the literature may be due, at least in part, to differences between measures.

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12:00-1:30 PM (2140)

4.5-Month-Old Infants Readily Distinguish Female – but Not Male – Talkers. MADELEINE E. YU, NATALIE FECHER, and ELIZABETH K. JOHNSON, *University of Toronto* (Sponsored by Elizabeth Johnson) – Most developmental speech perception studies have used female voice recordings as stimuli; however, there is good reason to suspect that infants process male and female voices differently. Here, we report preliminary results of a study using the Visual Fixation Paradigm to examine 4.5-month-old infants' ability to tell apart talkers when presented with two female talkers versus when presented with two male talkers. Infants exposed to two female talkers (N = 48) successfully distinguished the talkers (p < .001), whereas infants exposed to two male talkers (N = 35) did not (p > .05). Interestingly, these results cannot be explained by differential attention to male versus female voices as infants in both groups used an equivalent number of trials to reach the habituation criterion before entering the test phase ($M_{\text{female}} = 9.3$; $M_{\text{male}} = 10.0$; p > .05). Future work will examine whether talker gender impacts performance on other tasks, such as phoneme discrimination.

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12:00-1:30 PM (2141)

Identification of Code-Switches in Unfamiliar Languages. ERIKA L. EXTON and ROCHELLE S. NEWMAN, University of Maryland, College Park (Sponsored by Rochelle Newman) - Both adults and infants can distinguish between unknown languages on the basis of stress patterns and some phonological cues, but it is unclear how quickly they can do so when a speaker is alternating between languages. The present study explores adults' ability to identify code switches in unfamiliar languages and considers the effects of language similarity and speaker accent on their ability to do so. Most studies that look at language discrimination by adults present each language separately in an ABX discrimination task, often editing the signal to isolate a single acoustic cue (i.e., syllable duration). This study instead aims to present a naturalistic code-switching scenario in which the speaker is fluent in both languages but may have a non-native accent in one of them. Preliminary results suggest that adults are faster and more accurate to identify a language switch when (1) the languages differ in stress pattern (one stress-timed and one syllable-timed) and (2) the listener can explicitly identify both languages, compared to cases where both languages are syllable-timed; this suggests that naïve adult listeners may use stress pattern to differentiate between languages even when they are both spoken in a single utterance.

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12:00-1:30 PM (2142)

Good (Explicit) Learners Are Good Adapters: Cross-Task Correlations in Phonetic Plasticity. CHRISTOPHER C. HEFFNER and EMILY B. MYERS, University of Connecticut - Accurate speech perception requires behavioral plasticity. Listeners must dynamically change their categorization of phonetic tokens, whether adapting to accented speech, adapting to changing speech rates, or learning non-native sound categories. But to what extent are those abilities related to each other? The present study takes an individual differences approach, with 80 native English speakers completing two tasks of native-language phonetic adaptation, two of non-native phonetic learning, and several tests of other cognitive abilities. We find that people who are better at adapting to foreign accents and very fast speech are also better at learning phonetic categories with feedback, but that those abilities are not related to learning phonetic categories without feedback. These abilities



appear to be explained in part by common variance with vocabulary size and speech-in-noise measures. Results suggest that individual differences in phonetic plasticity may underlie native as well as non-native speech perception.

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12:00-1:30 PM (2143)

Expectations About Talker Identity Reshape Listeners' Phonetic Categories. CHRISTINA Y. TZENG, VERONICA VAZQUEZ OLIVIERI, and LYNNE C. NYGAARD, Emory University - Listeners dynamically modify the mapping between speech sound and representation as a function of multiple acoustic and linguistic factors, such as speech rate and lexical context. Here we assessed to what extent listeners' expectations about talker group identity (e.g., talker's age) would shift perception of acoustic-phonetic features (e.g., voice-onset time, VOT). In two experiments, listeners categorized sounds on VOT continua with /b/- and /p/-initial words that form minimal pairs as endpoints (e.g., beak - peak). Experiment 1 replicated previous work showing that manipulation of vowel length systematically shifts listeners' phonetic category boundaries. Primed with visual information about the talker's relative age (a photograph of an old or young talker), listeners in Experiment 2 showed category boundary shifts that varied as a function of age prime, suggesting that expectations about talker characteristics condition phonetic perception. Results (1) emphasize the role of top-down processes that are contingent upon listeners' tracking of group-specific variation and (2) suggest that listeners' expectations about spoken input are as powerful as signal-dependent processing of acoustic cues in achieving perceptual constancy.

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12:00-1:30 PM (2144)

Do Toddlers Use Prepositions to Learn Novel Words? THOMAS ST. PIERRE and SHUKRI NUR, University of Toronto Mississauga, ELIZABETH K. JOHNSON, University of Toronto Mississauga (Sponsored by Marieke van Heugten) -Children use grammatical information to learn the meanings of novel words, such as word order and grammatical number. This study tested whether novel words could be learned by 23-month-olds using prepositions. Children's knowledge of the prepositions used in the study (on, in, under, and next to)-determined by parental reports-was consistent with previous studies suggesting that in and on are learned earlier than under and next to. Interestingly, these reports were loosely corroborated by preliminary eye-tracking data (N=30), with looking behavior to objects following prepositions varying by preposition familiarity, making this the first study we are aware of to link the accuracy of parental reports for preposition knowledge to behavioral data. With regards to novel word learning, we only found weak evidence suggesting that children use prepositions to infer the meanings of new words. Currently, we are running an improved version of the study (based on what we learned from the study reported above) to better determine if toddlers indeed use prepositions in referentially ambiguous situations.

12:00-1:30 PM (2145)

Perceptual Learning of Altered Vowel Space in Dysarthric Speech. ANNIE J. OLMSTEAD, NAVIN VISWANATHAN, and JIMIN LEE, Pennsylvania State University - Dysarthria is a motor speech disorder that affects a person's ability to produce speech. However, the effects of this disorder on speech intelligibility are complex such that intelligibility can vary considerably between individuals and can change over time especially in degenerative conditions. Likewise, particular phonetic segments may be less intelligible than others. Nevertheless, there are patterns to the misidentification of dysarthric speech. These regularities offer the possibility of training listeners to perceive dysarthric speech more accurately. In the current study, we examine the perceptual learning of the altered vowel space in dysarthric speech produced by individuals with ALS. Specifically, we examine whether typical listeners can learn to adjust to vowel space changes and whether such learning can generalize to 1) untrained vowels and 2) other speakers with similar overall intelligibility. Implications for perceptual learning accounts as well as for caregiver and clinician training will be discussed.

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12:00-1:30 PM (2146)

Electrophysiological Measures of Speech Sound Encoding in Background Noise Reflect Accuracy and Self-Reported Hearing Difficulty. EMILY L. MARTINEZ (J. Frank Yates Student Travel Award Recipient), ANDREA M. RUGGIERO, ANI N. JAVARDIAN, and NICOLE F. FEELEY, Villanova University, THIERRY MORLET, Nemours/A.I. duPont Hospital for Children, JOSEPH C. TOSCANO, Villanova University (Sponsored by Joseph Toscano) - While many listeners recognize speech sounds relatively effortlessly, others report difficulty, particularly for speech in background noise. This difficulty may be due to disruptions in the encoding of fine-grained acoustic details, which, in turn, leads to speech perception errors. To investigate whether early perceptual encoding is related to hearing difficulty and/or accuracy, we recorded event-related potentials (ERPs) while listeners performed a consonant identification task in different levels of background noise. Specifically, we we looked at differences in the auditory N100, an index of early perceptual processing. We found that listeners who report greater difficulty understanding speech in noise were less likely to encode acoustic differences for place of articulation. Behavioral responses were also sensitive to initial cue encoding, such that encoding differed depending on whether or not listeners correctly recognized the sound. These results indicate that accurate speech comprehension relies on fine-grained acoustic information, and in the presence of competing auditory input, the inability to maintain detailed encoding of these cues leads to perceptual difficulties in understanding speech.

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12:00-1:30 PM (2147)

Modeling Temporal Contiguity in Incidentally Encoded Memories. ABIGAIL M. DESTER, LINH T.T. LAZARUS, and KARL HEALEY, *Michigan State University* – The temporal

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contiguity effect (TCE) is the tendency for the recall of one event to cue recall of other events originally experienced nearby in time. The Retrieved Context Model proposes the TCE results from *automatic* binding of events to a drifting mental context. An alternate account predicts a TCE only when temporal information is intentionally encoded. Healey (2018, JML, 102) demonstrated the TCE is present, but reduced, under incidental encoding. Here we attempt to replicate and model this finding. Subjects were assigned to explicit or incidental encoding and viewed a list of 12 words. A filled distractor intervened between study and recall. A reliable TCE was observed under explicit and incidental conditions, albeit reduced for incidental encoding. The Retrieved Context Model was able to fit the levels of overall recall and temporal contiguity in both conditions, indicating the Retrieved Context Model can account for the TCE in incidental encoding.

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12:00-1:30 PM (2148)

Computational Modeling of Variations in the Temporal Contiguity Effect. LINH T.T. LAZARUS, ABIGAIL M. DESTER, MITCHELL G. UITVLUGT, and M. KARL HEALEY, Michigan State University (Sponsored by Karl Healey) - Remembering one item in free recall often triggers recall of other items encoded nearby in time to the initial item. Retrieved Context Models can account for the existence of this temporal contiguity effect (TCE). They cannot, however, account for how various experimental manipulations modulate the size of the TCE. We attempt to replicate and model the finding that orthographic distinctiveness dramatically reduces the TCE (McDaniel, Cahill, Bugg, & Meadow, 2011, Memory & Cognition, 39). Participants were divided into two conditions: the distinctiveness group (n = 161) memorized lists of orthographically distinct words, and the control group (n = 152) memorized orthographically common words. In the distinctiveness group the TCE was attenuated (though not eliminated). Critically, a Retrieved Context Model fit the results by assuming orthographic distinctiveness changes context drift rate and the balance of pre-experimental vs. experimental context. We argue that this supports the item-order account of McDaniel et al. (2011).

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12:00-1:30 PM (2149)

Pattern Separation and Pattern Completion: Related or Dissociable Processes? CHI T. NGO, NORA S. NEWCOMBE, and INGRID R. OLSON, *Temple University* – Episodic memory requires (1) holistic retrieval of the multidimensional experiences in the presence of a cue via pattern completion, and (2) mnemonic discrimination of similar experiences to circumvent interference via pattern separation. Both computations depend on the hippocampus but have been studied separately in different behavioral paradigms. This study investigated whether holistic retrieval and mnemonic discrimination are related or dissociable processes in the same group of young adults. Participants first learned events, each comprised of a place, an animal, and an object. Subsequently, their recognition performance was estimated for the degree of retrieval success contingency of within-event associations (indexing holistic recollection), and lure discrimination for a subset of events that contains a similar lure (indexing mnemonic discrimination). Gross accuracy between the two tasks strongly correlated, but specific behavioral expressions of holistic retrieval and mnemonic discrimination are dissociable from one another, providing evidence for the independence of the two mnemonic processes.

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12:00-1:30 PM (2150)

Recognition-Induced Forgetting of Pictures Does Not Operate over Superordinate Categories. PAUL S. SCOTTI, LAURA JANAKIEFSKI, and MADISON SMERDELL, The Ohio State University, ASHLEIGH M. MAXCEY, Vanderbilt University (Sponsored by Ashleigh Maxcey) - Recognitioninduced forgetting is the category-specific forgetting of pictures that occurs when a subset of a category of pictures is recognized, leading to the forgetting of the remaining pictures. Recognitioninduced forgetting does not operate over categories created by temporal relationships, suggesting this effect operates over semantic, not episodic, memory representations. Here we systematically confirm that superordinate-level categories of pictures are immune to recognition-induced forgetting, offering an alternative interpretation for the evidence that recognition-induced forgetting does not operate over temporal groupings. This interpretation reconciles theories of forgetting in episodic memory that were previously conflicting with recognition-induced forgetting. These results challenge the notion that retrieval- and recognition-induced forgetting arise from the same underlying mechanism and illustrate how levels of semantic categorization inform models of memory and forgetting.

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12:00-1:30 PM (2151)

Is Context Recognition a Separate Ability from Item Recognition? KYLE GRAMER FEATHERSTON, SANDRA HALE, and JOEL MYERSON, Washington University in St. Louis (Sponsored by Joel Myerson) - We investigated the relation between recognition memory for items and the contexts in which they are presented. Young adults were asked to remember series of names and unnamable objects, as well as the contextual information associated with those items (i.e., their size, location, and color). Following presentation of each series, recognition tests for items and context were administered. It has been proposed that memory for context, or source memory, differs from memory for items themselves. Confirmatory factor analyses of context memory scores suggested that separate factors accounted for memory for stimulus-bound contexts (color and size) and for non-stimulus-bound context (location). However, analyzing both item and context scores together provided no evidence of separate item memory and context memory factors. Instead, the best-fitting model separated recognition performance by item type, regardless of context. This finding suggests that there is no distinct latent ability for context recognition memory.

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12:00-1:30 PM (2152)

The Bizarreness Effect and Memory for Face-Name Associations. PAYAL PATEL, LISA LORENTZ, HANAE DAVIS, BRENDAN M. STANLEY, and DAVID I. SHORE, McMaster University - Being able to recall a face and name supports social interactions; however, this is a rather challenging task. We tested whether vocalizing names in an unusual voice can improve subsequent memory for an individual's face and name. The memory literature has examples of enhanced memory for items that require bizarre mental imagery as opposed to normal mental imagery, and separate evidence of enhanced memory for items that are said aloud, as opposed to items read silently. However, it is unclear whether bizarre production of names compared to regular production of names will lead to enhanced memory for faces, names, or face-name associations. In the present study, participants studied facename pairs while vocalizing the names in a bizarre voice or a normal voice. Memory for face-name associations was tested using cued recall tests and a recognition test. Participants' eye movements were recorded during learning to see if bizarre production of names alters face-tracking patterns, as compared to normal production of names. These results will be discussed in terms of the bizarreness effect and the production effect, as well as face perception and identification theory. Email: David I. Shore, dshore@mcmaster.ca

12:00-1:30 PM (2153)

Binding Visual Information in Memory. KACIE MENNIE, Louisiana State University, SEAN LANE, University of Alabama, Huntsville (Sponsored by Sean Lane) - Two experiments examined how objects in scenes bind to each other in memory. In both, participants viewed scenes containing various objects. Attention was directed to half of the objects in the scenes using an auditory cue. In Experiment 1 (n=97), participants saw blurred scene information at test. On a subset of trials, three cue objects, which had been either attended/unattended at encoding, were clearly visible. Participants completed a recognition test for items which had been attended or unattended. A target item by cue type interaction revealed that attended targets were better remembered when cued with attended objects, relative to attended targets with no cues. Experiment 2 (n=65) provided a stronger measure of direct object-binding because the associative recognition test contained no contextual cues. The pairs were comprised of two attended or unattended objects, or one attended and one unattended item. Attended pairs were remembered best. Mixed pairs resulted in the worst performance. Participants were more likely to false alarm to mixed pairs than completely unattended pairs. The results of two experiments support the hypothesis that individual objects can be bound directly to each other in memory. Email: Kacie Mennie, kaciemennie@gmail.com

12:00-1:30 PM (2154)

Color-Word Contingency Learning with Unfamiliar Characters. ALBERT F. SMITH and JUSTIN D. MCELHANNON, *Cleveland State University* (Presented by Albert Smith) – The color-word contingency-learning effect is the finding that when identifying the colors of letter strings in stimulus sets in which color is highly, though not perfectly, correlated with string identity, participants respond faster to strings for which a color predominates than to strings for which a color does not predominate. English readers exhibit this effect rapidly when strings are English words. We investigated performance by English readers when the strings were Korean words; after completing the task with Korean stimuli, participants responded to English stimuli. We hypothesized that when strings consist of unfamiliar characters, so are likely less codable and possibly less discriminable, the color-word contingency-learning effect would manifest later or not at all. With Korean words, we observed a statistically significant color-word contingency effect only in the sixth of eight trial blocks, whereas with English words, we observed the colorword contingency effect in six blocks, including the first two. Email: Albert F. Smith, a.f.smith@csuohio.edu

12:00-1:30 PM (2155)

Age Differences in Memory for Socially Important Associations. LINGQIAN LI, JULIA SCARINGI, and LIXIA YANG, Ryerson University (Presented by Lingqian Li) (Sponsored by Lixia Yang) - Age-related associative memory deficits have been well documented. Recent research suggests that this deficit could be much reduced for names and occupations associated with faces described as socially significant (e.g., smiling, with descent occupation, and participants will have personal interactions in the future, Hargis & Castel, 2017). However, it is unknown whether the effect will be generalized to neutral faces arbitrarily assigned as socially important. This study intended to address this question. Young and older participants studied face-name-occupation triplets, and then recalled names and occupations. Faces were all with neutral-expression, evenly and arbitrarily cued as socially "important" or "unimportant". This is followed by a cued recall task in which they recalled name and occupation associated with each face. The results showed that while young adults outperformed older adults in memory for names, age differences were eliminated in memory for occupations. However, the experimentally arbitrarily assigned social importance does not appear to benefit the older adult participants.

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12:00-1:30 PM (2156)

Relations Are Not Always Beneficial: The Effect of Associative Direction on Judgments of Learning. NICHOLAS P. MAXWELL and MARK J. HUFF, *University of Southern Mississippi* (Sponsored by Mark Huff) – The associative direction of cue-target pairs has been shown to affect the accuracy of memory predictions through judgements of learning (JOLs). Forward associative pairs (e.g., credit-card) are generally well calibrated (i.e., similar JOL estimates and later recall accuracy), however JOL ratings often exceed later recall accuracy for backward pairs (e.g., card-credit). The present study evaluates this pattern by examining the correspondence between JOLs and recall accuracy on symmetrical (e.g., salt-pepper), forward, backward, and unrelated pairs when study was either self-paced (Experiment 1) or when a 5-second deadline was given to study and provide a JOL (Experiment 2). Across experiments, JOLs accurately estimated recall accuracy for forward pairs, but overestimated recall for symmetrical, backward, and unrelated pairs. Novel calibration plots depicting JOL ratings against their corresponding recall accuracy indicated JOL overestimations occurred across all recall accuracy levels for unrelated and backward pairs, but JOLs only overestimated recall accuracy for symmetrical and forward pairs when recall accuracy was relatively high (> 60%).

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12:00-1:30 PM (2157)

Pupillometric and Gaze Location Evidence for Preferential Encoding of Aloud Words in the Production Effect. BRADY R.T. ROBERTS, DAVID MCLEAN, NOAH D. FORRIN, EVAN F. RISKO, and COLIN M. MACLEOD, University of Waterloo (Sponsored by Colin MacLeod) - The production effect refers to the finding that words read aloud are better remembered than those read silently. In the current experiment, participants studied a mixed-list of 'aloud' and 'silent' words while their pupil dilation and eye movements were recorded. Pupil diameter at study was significantly larger for words read aloud relative to words read silently. As well, there were more fixations on aloud words than on silent words during encoding. This evidence points to greater cognitive effort during study on aloud trials as a mechanism underlying the production effect. In contrast, at test, there were no differences in pupil size or number of fixations between previously seen 'old' aloud and silent words. This suggests that preferential processing of aloud words in the production effect occurs primarily during encoding, not retrieval. Additional studies are currently under way with the aim of further delineating the neuro-cognitive phenomena at play in the production effect.

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12:00-1:30 PM (2158)

Neural Reactivation After a Month-Long Delay for Word-Concept Associations. HEATHER BRUETT, REGINA CALLOWAY, NATASHA TOKOWICZ, and MARC N. COUTANCHE, University of Pittsburgh (Sponsored by Marc N. Coutanche) - Neural representations of encoded information in memory change over time, but the mechanisms underlying these changes remain unclear. In this study, we used functional magnetic resonance imaging (fMRI) to measure neural activity in native English-speaking participants as they learned pairings of Dutch words with images of novel animals. This was followed by a scan approximately one month later in which they retrieved what they had previously learned. We found univariate activation differences in a network of regions, including parietal and visual processing regions, during retrieval between items that were subsequently remembered and those that were forgotten, as well as between pairs that were tested the day after learning and those that were not. Multivoxel pattern reactivation was also observed at the level of individual pairs between encoding and retrieval one month later, in the angular gyrus, parahippocampal gyrus, and visual word form area. Email: Heather Bruett, heb52@pitt.edu

12:00-1:30 PM (2159)

How Flexible Is the Prediction in Prediction Error Learning? JUSTINE K. GREENAWAY and EVAN J. LIVESEY, The University of Sydney (Sponsored by Evan Livesey) - Cue competition phenomena have greatly influenced theories of learning as they demonstrate that the strength of learning is lawfully related to prediction error. Competitive effects like blocking, in which the formation of a cue-outcome association is blocked by a competing cue that already predicts the outcome, are reliably observed in human causal learning. Blocking suggests that associative history determines the predictions important for learning. However, associative memory is not necessarily a reliable source of information, and causal judgements are sensitive to instructions that contradict associative history. Are the predictions that are important for associative learning also a product of the best available information, or solely associative history? We manipulated the relevance of prior learning through explicit instructions and measured the effect that this had on causal ratings, memory for specific associations and overt attention to cues. While we were able to shift causal judgements with direct instructions, associative memory exhibited deficits consistent with associative prediction error. These results have implications for prediction error models of human learning. Email: Justine K. Greenaway, jgre7001@uni.sydney.edu.au

12:00-1:30 PM (2160)

Memory Consolidation and Gist Extraction in a Virtual Environment. JAMES W. ANTONY, Princeton University, KATHRYN N. GRAVES, Yale University, JARRYD OSBORNE, University of Pittsburgh, NICHOLAS B. TURK-BROWNE, Yale University, KELLY A. BENNION, California Polytechnic State University - Theories of consolidation suggest that initially rich, vivid memories become more gist-like over time. However, the extent to which gist-like representations resemble statistical averages of experience is unknown. Here, we tested this idea by having human participants navigate through a virtual maze to find hidden objects whose locations varied according to spatial distributions. Critically, there was no object at the mean of these distributions, allowing 'false' memory for the mean to represent the statistical average of experience. Participants returned to take tests on these distributions after 15 minutes, 1 day, 1 week, or 28 days, which included navigating to the same locations and explicitly identifying those locations on paper. Contrary to the idea that long-term gist extraction is the same as statistical averaging, representations for the mean location, as assessed by navigation and explicit memory, were present at the first two retention intervals and gradually decreased to chance over time. Email: James W. Antony, jantony@princeton.edu

12:00-1:30 PM (2161)

Curriculum Effects in Event Prediction. ANDRE BEUKERS and KENNETH A. NORMAN, *Princeton University* (Sponsored by Jeffrey Zacks) – How does blocked vs. interleaved training affect learning? Here, we extend the study of curriculum effects to a statistical learning task involving explicit prediction. Participants had to learn to predict the sequences of events that took place in stories generated from two different Markov graphs. We manipulated whether stories from the two graphs

were presented in blocked or interleaved fashion during training. We hypothesized that learning would be better in the blocked condition: In this condition, large prediction errors at the start of a new block should help the brain infer that a new latent cause is present, minimizing interference with prior learning. As hypothesized, performance was excellent in the blocked condition; by contrast, performance in the interleaved condition was much lower, even when participants were explicitly instructed to pay attention to cues that signal the different graphs. We are now following up on these results with subject level modeling.

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12:00-1:30 PM (2162)

The Role of Attention in Recollecting Episodic Changes. SYDNEY GARLITCH, University of North Carolina at Greensboro, CHRISTOPHER N. WAHLHEIM, University of North Carolina at Greensboro (Sponsored by Christopher Wahlheim) - The Memory-for-Change framework proposes that detecting and recollecting change can counteract proactive interference. Detecting change requires attention to stimulus features, and people vary in their ability to sustain attention across time. In the current experiment, we examined the consequences of variation in attention on the ability to recall more recent information and recollect change under conditions of interference. We measured attention fluctuation by inserting thought probes throughout a list of word pairs. Critically, in the last quarter of the list, some pairs included the same cue as pairs from earlier in the list but with a changed response (e.g., kneebone; knee-bend). Participants completed a cued recall test for all items in the last quarter and reported when they recollected changes. Proactive facilitation occurred when change was recollected, and proactive interference occurred when change was not recollected. On-task reports to thought probes were associated with higher recall and change recollection. This association emerged within and between participants. The results show that the ability to sustain attention is associated with detecting and recollecting change in the service of updating episodic memory.

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12:00-1:30 PM (2163)

The Benefits of Repetition In Learning: What Is the Role of Awareness? PARKER A. SORENSON and COLLEEN M. KELLEY, *Florida State University* (Sponsored by Colleen Kelley) – Repeated experience is a cornerstone of learning and memory, but to what extent does the benefit of repetition depend upon noticing it? Asch (1969) reported that learning a number-letter pair to criterion did not help participants relearn the same pair in a new list unless participants noticed the repetition. The formal memory models SAM and REM incorporate aspects of Asch's result by assuming that an initial experience establishes a memory trace which is added to during a repetition, but only if the repetition accesses the original trace. If the repetition is not noticed, a second memory trace is created. We attempted a conceptual replication of Asch using word pairs where one pair is learned to criterion in a first list, and then repeated in a

second list. Participants were either informed or not informed that one pair in the second list would be repeated from the first list, and awareness of the repetition was assessed. Email: Parker A. Sorenson, ps16k@my.fsu.edu

12:00-1:30 PM (2164)

Variation in the Consistency of Attention at Encoding and Learning Ability. ASHLEY MILLER and NASH UNSWORTH, University of Oregon - The present study examined whether variation in attention at encoding is related to associative learning ability. In two experiments, participants performed measures of working memory capacity (WMC), long-term memory (LTM), motivation, and a paired associates (PA) cuedrecall task with thought probes embedded throughout the encoding phase of each word-pair list. Experiment 1 revealed those prone to attentional lapses tend to have lower motivation and worse LTM ability; lapses at encoding were unrelated to WMC. Those who lapse the most also displayed worse PA recall accuracy. In Experiment 2, pupil diameter was simultaneously recorded to examine variation in the amount of attention devoted to items at encoding. Results replicated Experiment 1 and further revealed increased susceptibility to lapses was associated with smaller pupillary responses at encoding. Critically, both pupillary responses and attentional lapses accounted for unique variance in PA recall accuracy even when accounting for WMC, LTM ability, and motivation. Collectively, the results suggest the amount of resources allocated to learning and how consistently those resources are allocated to items are related to each other and to overall learning abilities. Email: Ashley Miller, amiller8@uoregon.edu

12:00-1:30 PM (2165)

Chunking Long Sequences in Human and Non-Human Primates. LAURE TOSATTO, Aix-Marseille University, JOËL FAGOT and ARNAUD REY, Aix-Marseille University, CNRS (Sponsored by Arnaud Rey) - Chunking is a core phenomenon in statistical learningand several studies have shown that learning a long visuo-motor sequence implies parsing it into small chunks of information for humans (Abrahamse, Ruitenberg, De Kleine & Verwey, 2013) as well as animals (Conway & Christiansen, 2001). However, there has been no comparative approach of the phenomenon. In the present study, 20 human participants and 20 Guinea baboons (Papio papio) performed a visuo-motor sequence composed of 9 elements during respectively 400 and 1000 trials. The evolution of response times for each element of the sequence revealed chunking mechanisms in both humans and baboons, and similarities in the size and evolution of chunks throughout trials. These findings provide precious information about these fundamental mechanisms and the neural networks supporting this form of associative learning.

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12:00-1:30 PM (2166)

Statistical Learning on Time Information of Blank Durations. SACHIO OTSUKA, *Doshisha University* – This study examines whether statistical regularities of time information of blank durations embedded in a visual sequence can be learned. In the familiarization phase, participants observed a stream of visual objects. Forty-eight objects were presented in random order, but the durations of each of the three successive blanks (i.e., triplets) were fixed in the same order (e.g., 600ms-1000ms-750ms, 700ms-800ms-1050ms). In the subsequent forcedchoice familiarity test, two sequences were presented: 1) A target sequence made of a triplet with a sequence of blank durations presented in the prior phase (e.g., 600ms-1000ms-750ms); and 2) A foil sequence that was created with time information from a different triplet (e.g., 600ms-800ms-500ms). Participants were required to judge which of the two sequences were more familiar based on the prior familiarization phase. The results showed that there was a greater chance of familiarity for the triplets that had the regularities of blank durations. This result suggests that people can learn statistical regularities of blank durations based on time information without conscious awareness. Email: Sachio Otsuka, sotsuka@mail.doshisha.ac.jp

12:00-1:30 PM (2167) Insulating Continuous Learning Models from Catastrophic

Interference. WILLA M. MANNERING and MICHAEL N. JONES, Indiana University (Sponsored by Michael Jones) - The semantic memory literature has recently seen the emergence of predictive neural network models that use principles of reinforcement learning to create a "neural embedding" of word meaning. These models have found remarkable success at fitting human data; however, they also inherit the weaknesses of their ancestors. In this paper, we explore the effect of catastrophic interference (CI) on a modern neural embedding model of semantic representation (word2vec). We use homonyms as an index of bias as a function of the order in which a corpus is learned. If the corpus is learned in random order, the final representation will tend towards the dominant sense of the word (bank-money) as opposed to the subordinate sense (bank-river). However, if the subordinate sense is presented after learning the dominant sense, CI almost completely erases the dominant sense and the final representation strongly tends towards the more recent subordinate sense. Here, we demonstrate the impact of CI on the final neural embeddings learned by word2vec in both an artificial language and in an English corpus and evaluate the effectiveness of a recently proposed solution to CI from neuroscience, elastic weight consolidation, on mitigating the effects of CI.

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12:00-1:30 PM (2168)

Competition-Focused Instruction Undermines Self-Regulated Study Habits in College Students. SARA G. GOODMAN, *St. John Fisher College*, TRAVIS L. SEYMOUR, *University of California, Santa Cruz* – Educators have the ability to influence self-regulatory behavior during study sessions by modifying instructions and task difficulty. However, the impact of these task parameters may manifest differently based on goal framing toward mastery or performance outcomes. We investigated the impact of goal framing and task difficulty on self-regulated study habits and comprehension outcomes. Students read one of two articles equated for content but differing in technical language (easy vs. difficult), then took a pretest to assess baseline comprehension. Students were sent home to engage in self-regulated study after assignment to one of three goal framing conditions (control, mastery, performance). Students took a final comprehension test 24-48 hours later. Results indicate that emphasizing competition and performance undermines achievement in college students when left to self-regulate learning for difficult tasks. Educators can use these findings to modify instructions based on task difficulty in order to facilitate students' improved motivational self-regulation.

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12:00-1:30 PM (2169)

Does Political Party Influence Memory for the Mueller Report? BLAIR E. BRAUN, JARUDA ITHISUPHALAP, and MARIA S. ZARAGOZA, Kent State University - News agencies released Attorney General Barr's summary of the findings of the Mueller Report investigation on March 24, 2019, and provided continuous coverage after the release. Both 3 weeks and 6 weeks after Barr's summary was released, we assessed whether self-reported political affiliation (Republican vs. Democrat) influenced people's memory for the Mueller Report. Participants who endorsed knowledge of the Mueller Report findings (N= 218) were presented with the 6 major findings included in Barr's summary verbatim, and were asked to indicate (on a 5-point scale) whether or not the statement was a conclusion reached by Mueller's investigation. Results showed that memory accuracy was a function of compatibility with prior political affiliation: for findings related to Russian interference in the election, Democrats were more accurate than Republicans, whereas for the failure to find evidence that President Trump and his campaign conspired/colluded with Russia, Republicans' memory was more accurate than Democrats. Email: Blair E. Braun, bbraun2@kent.edu

12:00-1:30 PM (2170)

How Gains and Losses Influence Remembering Across the Lifespan. SEBASTIAN S. HORN, University of Zurich - The frequency of gains and losses changes across the lifespan. Younger adulthood is a period in which gain-related experiences predominate, whereas loss-related experiences become increasingly pertinent in older adulthood. Motivation research suggests that people's goal orientation may change correspondingly, shifting from achieving gains (younger adults) towards maintenance (middle-aged adults) and loss avoidance (older adults). From a motivated-cognition perspective, these motivational changes may also influence cognitive functioning, including memory. Older adults' performance may be driven more strongly by the negative consequences of memory failure (avoidance goals) than by the positive consequences of successful remembering (approach goals). This proposition is examined in a series of experimental studies and cognitivemodeling analyses with younger, middle-aged, and older adults, using different memory paradigms. The findings indicate that the magnitude of adult age differences in memory performance depends on whether negative or positive consequences are

emphasized. The investigation of memory processes from a motivated-cognition perspective helps to better understand the factors underlying age differences in performance. Email: Sebastian S. Horn, horn@psychologie.uzh.ch

12:00-1:30 PM (2171)

The Relationship Between Attributes of Emotional Pictures and Memory. TETSUYA FUJITA, Hosei University, MIZUKI KATO, Tama University - Fujita and Kato (2015, 2016, 2017) have shown that the ratings of evoked arousal, evoked valence, inherent arousal, inherent valence, self-reference, and brightness for emotional pictures have the encoding effects. In the present study, recall data in those studies were calculated for each emotional picture and used as each index of possibility of recall. Furthermore, averaging the above six rating values for each emotional picture, it was regarded as the value of six attributes of each pictures. In addition, each ratings of evoked/ inherent valence (intensity) were calculated by reversing the two kinds of ratings so that the larger the unpleasant emotion for the negative pictures, the larger the rating. Using the above eight ratings and the possibility of recall, it was examined by the multiple regression analysis which of arousal and emotional valence had a stronger influence on memory for recall of the emotional pictures. As a result, it was shown that evoked arousal had a significant effect when the analysis was performed using evoked and inherent valence. On the other hand, when evoked and inherent valence (intensity) were used, it was shown that a significant influence effect from evoked valence (intensity). Email: Tetsuya Fujita, fujita009@nifty.ne.jp

12:00-1:30 PM (2172)

Interfering with Memory for Negative Information. RYAN CHRISTOPHER YEUNG and MYRA ANNETTE FERNANDES, University of Waterloo (Sponsored by Myra Fernandes) - Emotional information, compared to neutral information, is better remembered. Given that emotionality may strengthen memories, we asked whether emotional memories were more resilient to the detrimental effects of divided attention. Forty undergraduate students intentionally encoded words that were either neutral, positive, or negative in valence. Participants then performed free recall for the words, under either full attention (with no distracting task) or divided attention (concurrently with a distracting task; i.e., making animacy judgments on distractor words) in a counterbalanced, within-subjects design. Results showed that under full attention, recall was significantly enhanced for negative words, relative to both neutral and positive words. Under divided attention, recall was significantly impaired across all valences. Critically, under divided attention, recall of negative words was no longer significantly different from recall of neutral or positive words. Findings suggest that dividing attention during recall interferes with the specific mechanisms by which negative emotion typically improves memory.

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12:00-1:30 PM (2173)

Retroactive Selective Memory Enhancement via Emotional Arousal. SARA N. GALLANT, University of Southern California, JUNGWON MIN, SHELBY L. BACHMAN, and MARA MATHER, University of Southern California - Research suggests that consolidation of weakly-encoded information can be enhanced if the semantically-related neural substrate of those memories is activated by a salient event. This neurobiological tag-and-capture mechanism is useful as it allows for meaningful memories to be "tagged" and promoted to long-term memory for future use. Here, we tested whether viewing emotionally arousing faces would enhance selective memory of neutral face versus neutral scene images. To determine the temporal directionality of arousal's effect, we manipulated whether arousal occurred before or after encoding of neutral faces and scenes. After 24 hours, memory was tested for all neutral images. In Study 1, pre-encoding arousal did not modulate incidental memory, whereas post-encoding arousal enhanced selective memory of neutral faces versus neutral scenes. In Study 2, we used a similar approach to test the effects of preand post-encoding arousal on intentional learning; however, arousal had no effect on intentional selective memory of neutral faces versus neutral scenes. Our findings suggest that viewing emotionally arousing images associated with a distinguishable neural substrate may retroactively enhance selective memory for related material.

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12:00-1:30 PM (2174)

The Influence of Punishment Associations on Conflict Processing in the Stroop Task. MING-RAY LIAO, LAURENT GRÉGOIRE, and BRIAN A. ANDERSON , Texas A&M University (Sponsored by Brian A. Anderson) - Motivated attention can be driven by the desire to maximize gains or escape punishment. In the Stroop task, when rewards can be obtained by responding quickly to certain colors, corresponding color-words are prioritized and produce enhanced interference regardless of task context. We conducted a parallel experiment, exchanging the prospect of reward with the opportunity to avert punishment. Participants identified the color (hue) of color-words; for punishment-associated colors, electric shock was delivered for responses that were slow or incorrect. Unlike prior research using reward, we found no differences in overall color-naming performance as a result of the punishment manipulation. However, we found a two-way interaction between the task-relevant (hue) and task-irrelevant dimension (word) for incongruent trials. Punishment-associated words more strongly impaired performance, but only on trials in which shock was possible. Our findings suggest that the motivation to escape punishment biases information processing, but only in a threatening context.

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12:00-1:30 PM (2175)

Information Importance Affects Offloading Decisions and Memory Performance. MARY B. HARGIS, *Texas Christian University*, ALAN D. CASTEL and ROBERT A. BJORK, *University of California, Los Angeles* – People often save important information to external sources, and the act of offloading can affect metacognition and memory. We assessed im how people offload information, and how offloading decisions a b affect recall and recognition. In Experiment 1, participants were tes shown 30 words to study, and could "save" six to the computer. The In Experiment 2, the words were paired with varying point to values indicating importance. After studying each of eight lists (with new words on each), participants recalled as many words as they could and saw feedback on how many words they and the computer earned (Experiment 1) or how many points they and the computer earned (Experiment 2). People used the offloading mechanism to its fullest extent. In Experiment 1, on a final surprise recognition test, participants recognized many of

the words they offloaded, suggesting that those items were not completely forgotten. In Experiment 2, the high-value words were frequently offloaded but were not recognized on the final test. We suggest that the amount of deliberation involved in the decision to offload words is associated with later memory, such that words requiring little or no deliberation are forgotten later, even if they were highly valuable during study. Email: Mary B. Hargis, m.hargis@tcu.edu

12:00-1:30 PM (2176)

Effects of Study Time and Imagery on Value-Directed Remembering. TARA K. PATTERSON and ALAN D. CASTEL, University of California, Los Angeles, BARBARA J. KNOWLTON, University of California, Los Angeles - People show the ability to encode high-value information over lowvalue information across a variety of circumstances, but are there encoding conditions that can influence people's sensitivity to value? In this experiment, we investigated the effects of study time and imagery on memory selectivity using the valuedirected remembering task. Participants viewed lists of words that ranged in value from 1-10 points and were instructed to maximize their score on free recall tests given after each list. Word-value pairs were presented at a fast (1 s) or slow (5 s) rate, and word lists contained items rated as low or high imagery. When presentation rate was fast, participants in the high imagery condition showed better memory selectivity relative to participants in the low imagery condition, whereas when presentation rate was slow, participants in the high imagery condition showed worse memory selectivity relative to participants in the low imagery condition. These results suggest that the ability to use value to direct memory can be influenced by encoding conditions and the properties of the tobe-remembered information.

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12:00-1:30 PM (2177)

Differences in the Effect of Self-Similarity of Behaviors and Beliefs on Impression Memory. ALLISON M. SKLENAR, University of Illinois at Chicago, MATTHEW P. MCCURDY, ANDREA N. FRANKENSTEIN, PAULINE URBAN LEVY, and ERIC D. LESHIKAR, University of Illinois at Chicago (Sponsored by James Pellegrino) – Recent work suggests that the self-similarity effect does not extend beyond similarity based on traits to similarity based on political ideology. The current study sought to directly test the effects of self-similarity of beliefs and behaviors against each other. Participants formed impressions of social targets based on their picture and either a behavior they performed or a belief they held, and were later tested on their memory for this information. Participants rated the traits implied by behaviors and the beliefs on similarity to the self. The self-similarity effect emerged for impression memory based on beliefs but not for behaviors, contrary to prior work. Furthermore, sentence memory was significantly better for behaviors than for beliefs for dissimilar others, consistent with a self-preservation mechanism, but there was no difference between sentence types for similar others. These findings suggest that political-implying information has a strong influence on memory for social targets. Email: Allison M. Sklenar, asklen2@uic.edu

12:00-1:30 PM (2178)

Reward Prediction Errors Create Event Boundaries in Memory. NINA ROUHANI, KENNETH A. NORMAN, and YAEL NIV, Princeton University, AARON M. BORNSTEIN, University of California, Irvine - Across four experiments, participants learned to predict rewards in distinct contexts; within each context, high-magnitude reward prediction errors (RPEs) indicated a shift in the underlying distribution of rewards. We assessed whether RPE events interrupt the mnemonic integration of sequential events by testing recognition priming and sequence memory for pairs that contained a high RPE event or not. We found recognition priming for both sequential pair types; however, this effect was diminished when testing pairs across a high RPE. We also found and replicated worse sequence memory for events across an RPE event. Altogether, these findings demonstrate that RPE events are both more strongly encoded and act as event boundaries that interrupt the sequential integration of events. We have developed a computational model that simulates these high RPE effects by creating a stronger and more separate memory trace, potentially offering a mechanism for classic primacy effects in memory. Email: Nina Rouhani, nrouhani@princeton.edu

12:00-1:30 PM (2179)

Memory Narrowing: Is It Due to Emotion or Motivation? AYCAN KAPUCU, Ege University, YILDIZ ÖZKILIÇ, Uludag University, SONIA AMADO, Ege University (Presented by Aycan Kapucu) - Memory narrowing refers to the enhanced remembering of emotional central information at the expense of peripheral details. This study examined the separate effects of motivation and emotion on memory narrowing in a modified monetary incentive encoding task in which winning or losing rewards either depended on participant's performance (motivation blocks) or occurred randomly (emotion blocks). Participants studied neutral images of an object against a background while trying to earn or not to lose money. Memory for both the objects and the backgrounds was tested after 30 minutes via a surprise recognition test in which participants decided whether each object/background was old, similar, or new. Although both motivation and emotion led to memory narrowing especially when participants aimed not to lose money, accuracy for the backgrounds was lower on the



motivation blocks than on the emotion blocks. These findings suggested that memory narrowing was primarily influenced by motivational, rather than emotional, factors.

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12:00-1:30 PM (2180)

The Role of Event Simulation and Goals on Snacking Behavior. KATHLEEN R. HUDSON, University of Illinois at Chicago, LISA E. MURPHY, University College Cork, KARL K. SZPUNAR, University of Illinois at Chicago (Sponsored by Karl Szpunar) - People commonly engage in passive overeating, consuming large amounts of calories at one time. This practice may lead to weight gain and obesity, a prevalent public health issue. In this study, we sought to replicate and extended recent findings indicating that engagement of episodic future thinking (EFT), imagining experiences that might occur in one's future, can reduce unhealthy caloric intake in otherwise healthy individuals (Vartanian et al., 2016). Across two well-powered laboratory experiments (N = 393), we found no evidence that engaging in EFT, as compared to a number of closely matched control conditions, reduced caloric intake in an undergraduate population. These null results were consistent regardless of whether the participants under consideration were women or men, restrained or unrestrained eaters, and whether or not they possessed relevant health goals. We interpret our findings from the perspective of preventative versus treatment-based approaches to the study of eating behavior.

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12:00-1:30 PM (2181)

Representing a Binding of Co-Actor's Response and Task-Relevant Stimulus Feature. AKIO NISHIMURA, Yasuda Women's University - Present study investigated whether co-actor's response history to stimulus features affect task performance. Two participants engaged in a joint version of the event file task (Hommel, 1998). Each trial started with a response cue that indicated who should press a button (R1). However, R1 execution was allowed only after go signal presentation. Then a target stimulus for speeded button press (R2) was presented. The go signal and the target, which varied in shape (Exp.1) or color (Exp.2), appeared at top or bottom location. Shape or color of the target indicated who should make R2. Task-relevant stimulus feature repetition resulted in faster R2 when neither of the participants had made R1, but this feature repetition benefit was eliminated or reversed to cost when co-actor had made R1. Task-irrelevant stimulus feature (i.e., location) repetition delayed R2 similarly for no R1 and co-actor R1 conditions. The findings suggest that a binding of co-actor's response and task-relevant stimulus feature is represented and affects task performance by interfering with one's own S-R associations in task representation.

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12:00-1:30 PM (2182)

Compatibility Effects for 3D Objects and 2D Pictures: Visual Salience or Grasping Affordance? AIPING XIONG, Pennsylvania State University, ROBERT W. PROCTOR, YAQI XU, and HOWARD N. ZELAZNIK, Purdue University

- The current study tested the hypothesis that affordances for grasping are activated more strongly by 3D real objects than by 2D pictures of the objects. Participants made left-right keypress responses to the handle or functional end (tip) of an eating utensil using compatible and incompatible mappings. In one session, stimuli were spoons mounted on a black board with the side to which the handle and tip pointed varying randomly. In the other, the stimuli were images of the spoons displayed on a black computer screen. Session order was counterbalanced across participants. 3D and 2D sessions showed a similar benefit for compatible mapping when the tip was relevant and a small cost of compatible mapping when the handle was relevant. These results agree with prior 2D experiments of ours indicating that visual salience is the factor determining these compatibility effects rather than graspability of the handle. Email: Aiping Xiong, axx29@psu.edu

12:00-1:30 PM (2183)

What You See Is How You Feel: How Social Anxiety Shapes Visual Perception and Attention. ALEXANDRA PAXTON and MEGAN CHIOVARO, University of Connecticut (Presented by Alexandra Paxton) - Who we are shapes how we engage with the world. In ecological psychology, affordances are all the ways that a specific person can engage with and act within a specific space at a specific time-ways that are (more or less) immediately understood by that person within that specific space. While affordance research often focuses on physical spaces and properties, somewhat less focus has been placed on affordances in clinical domains and social environments. At the same time, although social anxiety plays a profound role in shaping observable behavior, relatively less work has examined the general dynamics and contextual pressures that give rise to those changes. Here, we bridge these two domains to understand how social anxiety shapes basic dynamics of perception. We combine eye-tracking and recurrence quantification analysis to compare differences in gaze patterns of naturalistic social scenes after inducing social anxiety in subclinical populations; specifically, we compare how being the focus of social attention versus being a member of a social context alters gaze patterns. In doing so, we demonstrate the utility that the concept of affordances can have in understanding how social anxiety constrains or shapes perception broadly.

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12:00-1:30 PM (2184)

Understanding the Mechanisms in the Theory of Event Coding: Mismatch Interference Is Due to Response Selection Demands. MATTHEW HILCHEY and JAY PRATT, University of Toronto – The theory of event coding proposes that associations are formed between stimulus attributes (e.g., location, color, category) and the response decisions made to them. Because repeating an attribute or decision retrieves the decision or attribute recently associated with it, respectively, interference occurs when there is a mismatch. Oddly, mismatch interference is often absent when detection or localization responses are required to sequential targets. To test if interference can be generated in these tasks when non-spatial selections demands are increased, we required detection or localization responses to serially presented targets and manipulated whether target identity processing was required before response execution. To test if interference can be generated in these tasks when response selection demands are increased, we forced decisions between detection or localization responses on a trial-by-trial basis. The latter, but not the former, manipulation revealed interference effects, suggesting that mismatch interference is a by-product of increased response competition.

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12:00-1:30 PM (2185)

Exogenously-Directed Touch Can Interfere with Performance in the Multiple-Object Tracking Task. MALLORY E. TERRY, University of Guelph, IAN M. THORNTON, University of Malta, LANA M. TRICK, University of Guelph (Sponsored by Ian Thornton) - Multiple-object tracking (MOT) involves keeping track of several target items as they move among identical distractors. While Pylyshyn (2001) suggested that cognitive mechanisms used in tracking might overlap with those needed for action, Thornton & Horowitz (2015) found little interference when participants had to touch items in a relatively undemanding iPad version of the MOT task. Here, we increased MOT demands by using faster speeds and larger display-sizes. Participants tracked 1-4 targets among 10 items. There were 5 conditions: regular tracking, targets change colour, distractors change colour, touch color-change targets, touch color-change distractors. We found that performance deteriorated when participants were required to touch items that changed colour. With 1-2 targets, touch only interfered when participants touched distractors. With 3 -4 targets, touching any item was detrimental, but touching distractors caused most interference. We conclude that exogenously-directed touch can interfere with MOT performance when overall task demands are high. Email: Mallory E. Terry, terry@uoguelph.ca

12:00-1:30 PM (2186)

Minding the Gap (Or Overlap): Encoding the Temporal Dynamics of Natural Events. ANNA M. WRIGHT and DANIEL T. LEVIN, Vanderbilt University (Sponsored by Daniel Levin) - We investigated whether attending to a dynamically changing object results in temporally precise encoding of its configuration. In Experiment 1, participants viewed videos depicting a dancer and responded whenever a cut between shots occurred. The cuts were either overlaps (6 or 12 video frames of movement repeated from one shot to the next), ellipses (6 or 12 frames were skipped) or matches (the second shot began exactly where the first shot ended). 12-frame ellipses were detected relatively slowly, but otherwise mismatches were not easier to detect. In Experiment 2, participants attempted to differentiate mismatched edits (overlaps or ellipses) from matches. Accuracy improved as the degree of temporal mismatch increased, but in no condition were participants able to detect more than 50% of the mismatches. Although participants can encode temporally precise information if required, they are far from perfect, implying that this information is not necessary for event perception.

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12:00-1:30 PM (2187)

Shared Action Representation for Free- and Forced-Choice Actions: Behavioral and Psychophysiological Evidence. BENJAMIN RICHARDSON and LISA R. FOURNIER, Washington State University - Action execution is delayed, while retaining another action plan in working memory, if the two action plans partly overlap versus do not overlap (partial repetition cost, PRC). We examined whether PRCs occur between free- and forced-choice actions and whether these actions show similar psychophysiological responses-indicating that they share the same representations and action system. Participants retained an action to one event (A) while executing an action to a second event (B); then they executed the retained action. Actions to A and B partly overlapped or did not, and actions to B required a free- or forced-choice response. Results showed PRCs and larger P3b amplitudes for both freeand forced-choice actions when action B partly overlapped (vs. did not overlap) with action A. These findings, and other behavioral and psychophysiological evidence we will report, strongly suggest that endogenous (free-choice) and exogenous (forced-choice) actions share the same representations and action control system.

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12:00-1:30 PM (2188)

Bullet Time: Guns Slow Dynamic Facial Emotion Recognition. AARON L. GARDONY, US Army CCDC - Soldier Center, CARLENE A. HORNER, Tufts University CABCS, TAD T. BRUNYE, US Army CCDC - Soldier Center - The actionspecific account of perception (Witt, 2011) suggests that tools influence perception by changing one's ability to perform an action (e.g., a stick affords interaction with out-of-reach objects). Like sticks, guns are tools that permit remote interaction, namely application of deadly force at range. Extending recent research that suggests weapon carriage impacts attentional processing and scene perception, the present study investigated how weapon carriage impacts facial emotion recognition, a critical cognitive process for weapon-carrying individuals, such as military and law enforcement personnel. Participants viewed simulated facial animations morphing bidirectionally between neutral and emotional expressions and used either a basic game controller or an airsoft pistol to respond when a labeled emotion target (Neutral, Anger, Disgust, Fear, Happy, Sad, Surprise) was first perceptible. Results demonstrate that pistol use reduced response rates and increased response latency for both emotional and neutral target stimuli. Results are discussed in the context of the action-specific account of perception and prevailing theories of weapon effects on perception and cognition.

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12:00-1:30 PM (2189)

Avatars and Automaticity: No Evidence for Automatic Response Activation When Taking the Perspective of an Avatar. CHRISTIAN BÖFFEL and JOCHEN MÜSSELER, *RWTH Aachen University* (Sponsored by Peter Wühr) – In the socalled avatar-compatibility task, participants perform a spatial SR-compatibility task from the perspective of an avatar. Here, compatibility is determined by the avatar's perspective instead of the participant's own. In two experiments, we investigated whether these avatar-compatibility effects are caused by the automatic activation of responses that are compatible from the avatar's perspective. In half of the trials, the task forced participants to postponed their response until the automatic response activation had decayed by delaying the presentation of the task-relevant avatar. We expected a reduction of the avatarcompatibility effects with delayed presentation based on the reduced influence of automatic response activation. Instead, we observed larger compatibility effects from the avatar's point of view in the delayed condition. Furthermore, analyses of the reaction time distribution supported the absence of automatic response activation. We argue that these results call the role of automatic response activation for perspective-based compatibility effects into question.

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12:00-1:30 PM (2190)

Absolute Size Perception in Reachable and Non - Reachable Space. AYAKO H. SANEYOSHI, Teikyo University, CHIKASHI MICHIMATA, Sophia University - We investigated whether the absolute size would be correctly perceived in action and perception, especially within the reachable space. The experimental design consisted of 4 Positions (2 positions within reachable space and 2 positions in non-reachable space) and 2 method of responses (hand visible and hand nonvisible). A black disc stimulus was presented on the LCD monitor that was placed on one of the four positions. Participants estimated the diameter of the disc by opening their right forefingers and their right thumbs. In the visible condition, the right hand was fully visible. In the invisible condition, the right hand was not visible. The absolute size of the stimulus was precisely estimated irrespective of the position in the invisible condition. On the other hand, the size of the stimulus was underestimated when the hand was visible. These results suggested that the accurate absolute object size would be perceived both in the reachable and non-reachable space for action, while the size constancy would work well in both space conditions for perception. Email: Ayako H. Saneyoshi, a-sane@main.teikyo-u.ac.jp

12:00-1:30 PM (2191)

Assessing Changes in Body Representation Following a Tool-Augmented vs. Manual Gather-and-Sort Task. JOSHUA D. BELL and KRISTEN L. MACUGA, Oregon State University -Research has suggested that body representations can be shaped by tool-use, a process called tool embodiment. An increase in represented arm length following tool use has been inferred based on the compression of perceived tactile distance along the tool-using arm and more distal forearm bisection estimates. However, an alternative hypothesis is that a period of repeated reaching without a tool could similarly recalibrate arm length. The present study sought to test this hypothesis using the tactile distance judgment and forearm bisection paradigms and tried to eliminate some of the demand characteristics often present in such studies. Pre-post measures were taken as three groups of participants (hand-only, 60-cm tool, control group) performed a gather-and-sort task. The idle arm was tested

following tool use in the control group. Preliminary (n = 39 of 66) Bayesian analyses favored the interpretation that there were no meaningful changes in tactile distance judgments or forearm bisection following any of the three conditions. Email: Joshua D. Bell, belljosh@oregonstate.edu

12:00-1:30 PM (2192)

Comparing Imagery and Execution of Force Control Under the Feedback of Where and What. XIN-PING TIEN, National Central University, ERIK CHIHHUNG CHANG, National Central University, (Sponsored by Denise Wu) - The functional equivalence hypothesis assumes identical operating principles underlying motor imagery (MI) and motor execution (ME). The current study examined this hypothesis in a simple force control task which involves minimal spatial kinesthetic inputs. Visual feedback of spatial (where) or non-spatial (what) information to different groups of participants informed them the amount of force they applied on a platform. For both participants groups of feedback types, the performing duration as a linear function of task loading showed flatter slope for MI than ME condition, which is not exactly what the functional equivalence hypothesis would predict. Furthermore, subjective kinesthetic vividness correlated with visual vividness of MI for both types of feedback groups, suggesting equivalent integration between force control and the processing of "where" and "what" information. Further study may examine how generally the functional equivalence in force control is violated, and how other forms of feedback may modulate the equivalence.

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12:00-1:30 PM (2193)

Body Image and Autism: Multisensory Interference and Autistic Traits Predict the Dynamic Crossed-Hand Effect. THEODORE C.K. CHEUNG and LIN LAWRENCE GUO, University of Toronto Scarborough, ADAM FROST and CHRISTINA PEREIRA, University of Toronto Scarborough, MATTHIAS NIEMEIER, University of Toronto Scarborough (Sponsored by John Kennedy) - Mental representations of the body originate from multiple sensory and motor sources, and they might be altered in individuals with autism. To investigate the interplay of the different pieces of information and autistic traits, 29 young neurotypical adults completed the Autism Quotient questionnaire. Further, they made vibro-tactile temporal order judgements of their index fingers around the time of crossing or un-crossing their hands upon an auditory cue. Reaction times to the cues were more or less delayed due to the tactile stimulation and served as measures of multisensory interference. As expected, participants were more likely to confuse their two hands with crossed rather than uncrossed hands and the difference disappeared near movement onset. Crucially, the crossed-hand effect was predicted by a combination of interference and autistic traits. Our results shed new light on the role of multisensory processes and autism in the context of dynamic representations of the body.

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12:00-1:30 PM (2194)

Simple Models of Movement Coordination Account for Limited Portions of Pedestrian Road-Crossing Behavior in Virtual Environments. BENJAMIN J. CHIHAK, KEI YOSHIDA, and JAMES BORDWELL, Coe College - The ability to coordinate self-movement with the movements of other objects is an important survival skill. Movement coordination tasks such as navigating across a busy intersection have high consequences for failure. Critical to reducing the injury rates of roadway users is understanding what perceptual information and movement control strategies individuals use to cross heavily trafficked streets. A number of models of movement control have proposed simple perceptual mechanisms to explain how humans coordinate self- and object-movement. However previous research in virtual environments has shown that no movement strategy based on a single perceptual variable adequately describes how drivers, bicyclists, and pedestrians cross through gaps in traffic. Instead, findings suggest that people crossing busy intersections are employing complex road-crossing strategies that are likely the product of a number of perceptual processes. In the current study, participants were asked to walk through target gaps in a single lane of bicycle traffic presented in a virtual environment. Preliminary results suggest that pedestrian road-crossing behavior may consist of a predictable combination of simple movement control strategies. Email: Benjamin J. Chihak, bchihak@coe.edu

12:00-1:30 PM (2195)

The Effect of Visual Blur on Spatial and Temporal Accuracies in a Manual Interception Task. ANNA SCHRÖGER, Friedrich Schiller University of Jena, J. WALTER TOLENTINO-CASTRO and MARKUS RAAB, German Sport University Cologne, ROUWEN CAÑAL-BRULAND, Friedrich Schiller University of Jena (Sponsored by Rouwen Cañal-Bruland) - The visual system is more sensitive to spatial than temporal information (Recanzone, 2009). We examined whether manipulations of the visual informational value of a stimulus modulate spatial more than temporal representations in a manual interception task. Participants indicated on a touchscreen when and where a moving, simulated ball would cross a line. The ball and its trajectories were manipulated in various ways: the ball was occluded at different times, travelled along different parabolas with different speeds, and was displayed with different levels of Gaussian blur manipulating its visual informational value. Multilevel models of the temporal and spatial deviations calculated as root mean square errors revealed a significant effect of blur on spatial, but not on temporal accuracies. With increasing levels of blur spatial accuracy decreased, yet temporal accuracies remained unaffected. We conclude that manipulations of the visual informational value influence spatial more than temporal representations in a motor interception task.

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12:00-1:30 PM (2196)

Beyond Hick's Law: Additional Cost of Target Selection. JOO YONG PARK and JUNG YEON PARK, *Seoul National University* – Most people like to make selections. However, making a choice is not without its cost. In this study, we examined the target election cost in a simple reaction task. We used a target localization task modified from Tipper, Brehaut, and Driver (1990). Participants were asked to press the key corresponding to the location of the target. In Experiment 1, the number of targets was manipulated from 1 to 3, Reaction times (RTs) increased as the number of targets increased. In Experiment 2, participants responded to two targets in a row among either 2 or 3 targets. The results showed that RTs to the first target, but not to the second, increased when the number of targets was greater. Experiment 3 was carried out to examine whether the results of Experiments 1 and 2 were obtained because of the uncertainty caused by the increase in the number of targets as explained by Hick's Law. The potential target locations were 4, 6, 8, and also the number of targets were manipulated. When there was 1 target, RTs increased as the number of potential locations increased as expected from Hick's Law. However, when there were 2 targets, there was additional delay in RTs resulting from target selection on top of the delay caused by location uncertainty.

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12:00-1:30 PM (2197)

The Co-Presentation in an Asymmetry Joint Action: A Fnirs-Based Hyperscanning Study. XUEJUN BAI, QIHAN ZHANG, GUANG ZHAO, and YIXIN CHEN, Tianjin Normal University - Whether or not the clues of coactor's task can induce the copresentation in the asymmetry joint action task, and the interbrain relationship between the coactor and the actor in such effect are unclear. The present study was to explore the issues by using motion capture system and functional near-infrared spectroscopy (fNIRS) hyperscanning. The motion capture results showed that the clue of the coactor's task influenced the action of the actor (i.e. co-presentation effect). Crucially, the fNIRS results revealed that, compared to no clue condition, the activation level at rTPJ (right Temporoparietal Junction) of the actor, and levels of interpersonal brain synchronization for coactor-actor dyads at rDLPFC (right Dorsolateral Prefrontal Cortex) and rPMC-SMC (right Pre-motor and Supplementary Motor Cortex) were increased in clue condition, which was positively correlated with their eye-test performance. This suggests that rTPJ, rDLPFC, and rPMC-SMC are related to the co-presentation in asymmetric joint action task. Email: Xuejun Bai, bxuejun@126.com

12:00-1:30 PM (2198)

Higher-Level Decisions Are Effectuated by Means of Different Locomotor Adaptation Strategies. ERIC GRIESSBACH and ROUWEN CAÑAL-BRULAND, *Friedrich Schiller University* of Jena, OLIVER HERBORT, Julius Maximilian University of Würzburg (Sponsored by Oliver Herbort) – We examined which locomotor adaptation strategies participants choose to effectuate a priori decisions. To this end, participants were asked to walk to one of two a target tables positioned left and right of a central obstacle to collect rewards displayed before movement onset. Before approaching the lateral target, participants had to step into a designated zone in front of the obstacle. Results showed that differences in rewards always predicted the lateral decision. More importantly, dependent on the lateral decision participants showed three different locomotor adaptation strategies to place the contralateral step in the designated zone: i) participants adapted the number of steps, or ii) they switched the starting leg, or iii) they didn't follow consistent strategies. In the equal reward condition, decisions were highly variable. However, in this particular condition decisions were correlated with an overall starting leg bias, suggesting an effect of lowerlevel locomotor processes on lateral decision.

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12:00-1:30 PM (2199)

Learning a Novel Perception-Action Mapping: Error Magnitude, Speed/Accuracy Emphasis, and Reinforcement Learning. TEJAS SAVALIA, University of Massachusetts, Amherst, ROSEMARY A. COWELL and DAVID E. HUBER, University of Massachusetts, Amherst - When learning a new perception-action mapping (e.g., mirror writing), is it better to learn through trial and error, or by thinking before you leap? Perception-action mapping has been examined previously by distorting how a control device (stylus or mouse) produces movement of an onscreen cursor (e.g., rightward device movement produces upward cursor movement). In two different distortion conditions participants were trained for 9 blocks, with a 90-degree distortion introduced either suddenly or in 10-degree increments over blocks (Sudden/Gradual). In the Sudden condition, large errors in early blocks may have prompted mental rotation. In a final transfer phase, error was greater following Gradual than Sudden training. This may reflect the use of 'model-based' versus 'model-free' reinforcement learning (RL) models, under Sudden versus Gradual distortion. Alternatively, it may reflect a change along the speed-accuracy tradeoff (Sudden training encourages slowing). We replicated the Sudden/Gradual training effect, crossing this manipulation with speed versus accuracy emphasis. Supporting an RL interpretation, participants were faster and more accurate in the transfer phase after Sudden training regardless of speed/ accuracy emphasis.

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12:00-1:30 PM (2200)

The Autism-Spectrum Quotient in Professional Level Baseball Players. YOSHIKO YABE, DAIKI NASU, and MAKIO KASHINO, *NTT Communication Science Laboratories* – Physical clumsiness has been thought as a common feature of the autism-spectrum disorders (ASD). However, the tendencies which would be advantageous to be elite athletes such as attention to detail and being less influenced by others could partly share the traits of ASD. We measured the autismspectrum quotient (AQ; Baron-Cohen, et.al., 2001) scores in 17 professional and semi-professional baseball players. The mean AQ scores of Japanese males measured by Wakabayashi et al. (2006) was 19.1. In the baseball players we tested, the mean and median AQ scores were 20.6 and 23. The scores regarding two categories showing the tendency to attend to detail and the low social skill were 5.4 and 4.3 in baseball players. Those scores were 4.7 and 3.7 in the participants tested by Wakabayashi et al. (2006). Our preliminary data indicates a possibility that expertise for sport is made possible by the traits of ASD. Email: Yoshiko Yabe, yy47151@gmail.com

12:00-1:30 PM (2201)

Is the Time Window of Agency Effector-Dependent? NADIYA SLOBODENYUK, Carleton University - Sense of agency is an experience of control of own actions. Research involving simple hand movement (e.g., pressing a key on a keyboard) followed by a visual or auditory stimulus has shown that sense of agency diminishes with an increase in delay between an action and its causal outcome. A range of delays, however, can be tolerated even when they are perceived consciously, thus forming the time window of agency. The present study investigates the time window of agency for gaze action and subsequent display change (i.e. oculomotor agency) and explores effectordependent differences between oculomotor agency and agency over hand action. The relationship between the delay between the action and its causal outcome in oculomotor agency was found to be comparable to that in the case of had movement. However, the time window of oculomotor agency was found to be substantially wider with a somewhat different optimal range. Email: Nadiya Slobodenyuk, nadiya.slobodenyuk@carleton.ca

12:00-1:30 PM (2202)

Monitoring-Induced Disruption in Skilled Performance. JONATHAN PARILLO and GORDON D. LOGAN, Vanderbilt University (Sponsored by Gordon Logan) - Paying attention to the details of execution in skilled performance is generally thought to be disruptive. A limited amount of empirical research supports this commonly held belief. However, little research has explored the mechanisms behind monitoring-induced disruption. The present work builds upon previous research that documents the disruption due to monitoring of performance in skilled typing (e.g., Logan & Crump, 2009; Snyder & Logan, 2013) by looking into what determines the cost and difficulty of monitoring. In two experiments, we manipulated the number of fingers monitor and the length of the word to be typed. Participants were asked to monitor their performance by reporting whether they used a particular finger while typing a word. We found that average typing response time increases with the number of fingers to monitor, with little to no effect of word length. The accuracy of the report task showed a similar trend, suggesting that as the difficulty of monitoring increases, so does the cost.

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12:00-1:30 PM (2203)

A Call for a Need: Role of Assurance Professionals in Social and Environmental Accounting in Pakistan. SADAF KHAN, Sindh Madrassatul Islam University, SITI AIYSAH BINTI PANATIK, Universiti Teknologi Malaysia – This paper contributes to ongoing discussion on Social and Environmental Reporting that has rapidly increased in importance over the past decade. The role of Social and Environmental Reporting has become imperative from professional accountant especially today when there are limited natural resources and an increasing number of social issues plaguing the present generation. An empirical approach adopted to draw accountants' perceptions regarding social and environmental accounting and reporting practices in a developing country Pakistan. Survey questionnaire was employed and 150 Professional accountants were sampled. Findings suggest that professional accountants have positive attitudes toward social and environmental accounting, however this leaning is slow, with the absence of ICAP involvement. Implications of this study directed that international focus is imperative, otherwise it is less likely that professional accountants will take initiative and active role in the development and sustainability of social and environmental accounting. Therefore, more empirical research in this area is urgently called for.

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12:00-1:30 PM (2204)

Interindividual Differences in Experiencing Proactive Interference in Motor Skill Modification. LAURA SPERL and ROUWEN CAÑAL-BRULAND, Friedrich Schiller University of Jena (Sponsored by Andrea Kiesel) - We examined the role of executive functions, baseline performance, age and gaze behavior in experiencing proactive interference in motor skill modification. Skilled touch-typists typed short texts as fast and accurately as possible. After baseline measures, participants faced a rule change that prohibited the use of the left index finger thereby inducing proactive interference indicated by significant increases of total typing time. Whereas one group followed only verbal instructions regarding the rule change, the other group received an additional motor restriction rendering the use of the left index finger impossible. Moderated regression analyses revealed that performance declines after rule change were significantly predicted by age. Prepotent response inhibition and the motor restriction tended to (marginally significantly) decrease proactive interference; higher baseline performance, however, increased it. Finally, participants gazed significantly more to hands and keyboard after rule change. These findings highlight several predictors that may account for interindividual differences in proactive interference.

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12:00-1:30 PM (2205)

Illusions of Authorship in the Hierarchical Control of Actions: An Eeg Analysis. CIGIR KALFAOGLU, *Eastern Mediterranean University*, TOM STAFFORD and ELIZABETH MILNE, *University of Sheffield* – According to the hierarchical control theory (HCT, Logan and Crump 2011), skilled actions such as typing are controlled hierarchically: A higher level "outer-loop" generates actions in line with intentions; while an "inner-loop" executes outer loop's commands. HCT assumes separate monitoring mechanisms in each loop during typing: Inner-loop relies on online somatosensory feedback from effectors, while the outer-loop monitors the (visual) outcome on the screen. When these two sources conflict, error detection at outer (explicit ownership of errors) and inner (implicit, posterror slowing) loops dissociate. We used EEG measures of "implicit" and "explicit" error detection in addition to behavioral measures (ERN and Pe, respectively). Preliminary results show that both ERN and Pe are present when visual feedback falsely suggests error-free performance. This suggests the outer loop is capable of using non-visual feedback, contradicting one of the four main assumptions of HCT. Our results point to potential benefits of bringing the EEG and skilled actions literatures on performance monitoring together on refining related theories. Email: Cigir Kalfaoglu, cigirkalfaoglu@gmail.com

12:00-1:30 PM (2206)

Increases in Midline and Frontal Theta Reflect the Degree of Cognitive Control Required During Continuous Motor Performance When Explicitly Monitoring Output. SARAH R. PALKOWITZ and MICHAEL B. CHAMMANY, Loyola University Chicago, MATTHEW J.C. CRUMP, Brooklyn College, CUNY, LAWRENCE P. BEHMER, JR., Loyola University Chicago (Sponsored by Lawrence Behmer) - Monitoring the individual elements of a motor sequence during action execution tends to disrupt performance. One possible explanation for this disruption is that explicit monitoring turns an automated task into a serial task, thereby increasing the need for explicit control; however, little is known about the neural dynamics of cognitive control during continuous motor performance within a single trial. Here, we used EEG to measure changes in frontal and midline theta while participants typed four-letter words in which the level of explicit monitoring varied. Cues instructed participants to either type normally (low-monitoring) or to type the word using only the left or right hand, or to type the letters that appeared only on the left or right side of the keyboard (high-monitoring). RTs were significantly faster for low- compared to high-monitoring trials. We also observed significant increase in midline theta for high- compared to lowmonitoring trials, followed by an increase in frontal theta. These findings suggest that dynamic changes in cognitive control occur during continuous performance, and that depending on the demands of the task, these changes can manifest themselves within a single trial.

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12:00-1:30 PM (2207)

Changes in Cognitive Control After High-Demand Trials During Continuous Motor Performance: Slower Rts and Increases in Midline Theta. MICHAEL B. CHAMMANY and SARAH R. PALKOWITZ, Loyola University Chicago, MATTHEW J.C. CRUMP, Brooklyn College, CUNY, LAWRENCE P. BEHMER, JR., Loyola University Chicago (Sponsored by Lawrence Behmer) - Cognitive control paradigms tend to employ tasks that require a single response to a target stimulus while inhibiting incorrect responses associated with distractors. One common observation is that after incompatible trials RTs are slower for the next response, which is also accompanied by an increase in anterior cingulate (ACC) activity. The increase in ACC activity may be a marker for the increased need for control, or it may be an index for how much conflict exists in the environment. Here, we present behavioral and EEG data from a task in which participants typed 3- and 7-letter random strings and 3- and 7-letter normal words. RTs were slowest and ACC activity increased for trials that followed a random string trial. Importantly, there was no difference in ACC activity as a function of string length. These findings suggest that when executing a multi-response sequence, increased task demands on the previous trial can modulate behavioral and neural responses on the subsequent trial. Also, given the absence of a main effect for string length, the ACC may be more generally signaling the need for control after a difficult trial, and not necessarily reflecting the amount of conflict in the environment.

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12:00-1:30 PM (2208)

Bilingualism Modifies Resting-State Qeeg Brain Waves. JOHN G. GRUNDY, Iowa State University, RYAN M. BARKER, University of Toronto, JOANNA PORKERT, University of Groningen, ELLEN BIALYSTOK, York University - The present study examined 25 monolinguals and 25 bilinguals to assess the influence of bilingualism on resting-state power frequencies bands in the brain. Individuals sat at rest for 2-minutes with their eyes closed while we recorded EEG activity. Results revealed that degree of second-language (L2) usage for bilinguals positively predicted gamma, beta, and theta frequencies at temporal and frontal scalp regions. L2 usage also predicted increases across all frequencies in occipital regions. Monolinguals showed opposite effects. Increases in beta waves have been associated with increased language aptitude and memory, whereas theta and gamma both play pivotal roles in cognitive control. The finding that occipital regions were focal with L2 usage is consistent with the Bilingual Anterior to Posterior and Subcortical Shift (BAPSS) model. These findings are discussed in terms of how different facets of bilingualism reorganize brain networks over time.

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12:00-1:30 PM (2209)

Neural Evidence of Reactivating Memory for Recent Search Targets. LAUREN H. WILLIAMS, VICTORIA WILSON, and DAVID ALONSO, University of Utah, ROY LURIA, Tel Aviv University, TRAFTON DREW, University of Utah (Sponsored by Trafton Drew) - Memory for previously encountered information drives more efficient cognition: Otherwise, each visit to the subway would be a bewildering maze of confusing signs. We studied the neural underpinnings of this process by asking subjects to search for the same target repeatedly. ERP components associated with semantic processing (FN400) and attentional selection (N2pc) are sensitive to target repetition (Drew, et al. 2018). Do repeated exposures lead to a durable long-term memory (LTM) representation? Here, we directly tested this idea by measuring the response to previously repeated targets in a separate phase of the experiment. In phase 1 (p1), observers (n=20) searched for 198 objects on 6 consecutive trials. In phase 2 (p2), observers completed a memory test for the p1 targets. In phase 3 (p3), observers searched for the old objects and 198 new objects. ~60% of targets were correctly identified during p2, allowing us to categorize objects as remembered or forgotten. In p3, remembered objects were associated with a larger N2pc than new and forgotten objects, but there was no

difference in FN400 amplitude. This suggests the N2pc serves as an early marker of familiarity, reflecting enhanced attentional selection for objects in LTM.

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12:00-1:30 PM (2210)

Attentional States Affect Error-Monitoring Ability in Schizophrenia. MATTHIEU CHIDHAROM, JULIEN KRIEG, and ANNE BONNEFOND, INSERM - The purpose of the present study was to explore error-monitoring ability in patients with schizophrenia by distinguishing, within individuals, more error-prone periods ("out of the zone" state) and less errorprone periods ("in the zone" state) (Esterman et al, 2013). To this end, we recorded behavioral and electrophysiological data in a long-lasting Go/NoGo sustained attention task (the Sustained Attention to Response Task, SART) in 25 outpatients and 25 age-, gender- and education-pair matched controls. Our results revealed that during "in the zone" state, schizophrenic patients and controls made an equal number of errors and both exhibited a preserved midline frontal theta activity following an error. However, during "out of the zone" state, schizophrenic patients made more errors than controls and exhibited an altered midline frontal theta activity following an error. Those results suggest a preserved error-monitoring in patients with schizophrenia during periods of attentional stability. They underlie the importance to take into account the attentional fluctuations, i.e. the attentional states by which the subject pass through all along the task, when exploring cognitive deficits in psychiatric population.

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12:00-1:30 PM (2211)

Transcranial Stimulation and Attentional Control in the Antisaccade Task. TREVOR HAWKS and KEITH A. HUTCHISON, Montana State University - Transcranial Direct Current Stimulation (TDCS) is a noninvasive method of neurostimulation that involves applying a small current via electrodes to two locations on the scalp to modulate brain activity. Claims about TDCS's benefits range from improving attention and memory, to treatment for psychiatric disorders; however, few of these claims have been validated. The present experiment investigates the effect of TDCS on attentional control. Thirty participants received either 10 minutes of authentic TDCS (2.00 mA) or sham (0.01 mA) applied to the DLPFC. Following TDCS, they performed a saccade task in which they were randomly cued to execute a prosaccade or antisaccade response to stimuli presented following a 1500-4500 ms delay. On 11% of the trials, they received thought probes to assess mind wandering. Following past studies examining working memory capacity and saccade performance, we predicted any TDCS effects would be most apparent in the longer delay conditions. Surprisingly, the group receiving TDCS showed impaired, rather than improved, performance, and this was indeed most apparent at the longer delay. There were no differences in self-reported mind wandering.

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12:00-1:30 PM (2212)

Nature as a Modulator of the Error-Related Negativity. SARA LOTEMPLIO and EMILY SCOTT, University of Utah, RACHEL J. HOPMAN, Northeastern University, AMY MCDONNELL, TY MCKINNEY, BRENNAN PAYNE, SPENCER C. CASTRO, DAVID MCNAY, KEVIN GREENBERG, and DAVID L. STRAYER, University of Utah (Sponsored by Frances Friedrich) - According to Kaplan's Theory of Attention Restoration (ART), spending time in a natural environment can restore depleted cognitive resources. Specifically, ART suggests that nature can restore attentional resources by giving the executive attentional network a chance to rest and recuperate. In the present study, we used electroencephalography (EEG) to examine if exposure to nature affects neural correlates of the error-processing system, which is a part of the executive attentional network. Specifically, we examine nature could influence the Error-Related Negativity (ERN) component of the Event-Related Potential (ERP). If nature downregulates attentional network activity, we should expect decrease in ERN amplitude. To understand whether or not this is the case, we ran a within-subjects study where participants came in to the lab for a baseline, were tested again while on a multi-day camping trip, and then returned to the lab for a follow up. In all three sessions, participants completed an Erickson Flanker Task while EEG was recorded to elicit the error-related negativity. We observed a significant decrease in ERN amplitude when participants are tested outside in nature compared to testing before or after the trip in the lab. Email: Sara LoTemplio, slotemplio@gmail.com

12:00-1:30 PM (2213)

Investigating the Relationship Between Cognitive Function and Neural Connectivity in Type I Chiari Malformation Patients. MICHELLE L. HUGHES, University of Akron, JAMES R. HOUSTON, Middle Tennessee State University, SAREL J. VORSTER, The Cleveland Clinic, MARK G. LUCIANO, Johns Hopkins University, FRANCIS LOTH and PHILIP A. ALLEN, University of Akron - Type I Chiari malformations are structural dysmorphisms of the hindbrain and posterior cranial fossa that are associated with a multitude of symptoms including chronic occipital headache, muscle weakness, and vestibular disturbances. In the present study, 18 Chiari patients and 18 ageand gender- matched controls completed a neuropsychological battery (RBANS), self-report measures for pain and mental health, and underwent resting-state functional neuroimaging (rs-FMRI). Seed-based analysis revealed group differences in functional connectivity in several regions such that healthy controls displayed greater activation between cerebellar lobule IX and the anterior cingulate region as well as between lobule X and the left parahippocampal region. Chiari patients showed greater connectivity between the right PFC and superior frontal gyrus; meanwhile controls had greater connectivity between the right PFC and the frontal pole. Attention and pain associated with subsections of the default mode network (DMN) were found to explain some of these relationships. Email: Philip A. Allen, paallen@uakron.edu

12:00-1:30 PM (2214)

How You See Is What You Get: A Deep Learning Look at How Cognitive State Is Variably Informed by Key Aspects of Raw Eye Movement Data. ZACHARY J. COLE, University of Nebraska-Lincoln, KARL M. KUNTZELMAN, MICHAEL D. DODD, and MATTHEW R. JOHNSON, University of Nebraska-Lincoln (Sponsored by Jeffrey Stevens) - Psychologists have long attempted to identify cognitive state from eye movement data (e.g., Yarbus, 1967) with mixed results (Einhauser et al., 2008; Greene et al., 2012). The current study used state-of-the-art deep learning methods to systematically characterize the contributions of different eye movement variables to cognitive task predictions. Participants were presented with color images of scenes (interior and exterior locations, no people) while performing a search, memory, or preference task. Each image was viewed for several seconds while an eye tracker (1000 Hz) recorded eye movements. The data were processed into several basic image and data formats excluding explicit notation of saccades, fixations, dwell times, etc. A convolutional neural network (using the DeLINEATE toolbox; http://delineate.it) was trained to predict cognitive task in each case. Classification accuracies suggested that task was best predicted by the x-coordinate distribution, followed by y-coordinate distribution, with pupil size adding relatively little predictive value.

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12:00-1:30 PM (2215)

Influences of Motherhood on the Neural Correlates of Eye Contact with Adult and Infant Faces. SHADI BAGHERZADEH AZBARI, Humboldt-Universität Zu Berlin, ANDREA HILDEBRANDT, Carl von Ossietzky Universität Oldenburg, WERNER SOMMER, Humboldt-Universität zu Berlin (Sponsored by Werner Sommer) - Eye contact and facial expressions are crucial for social interaction. Since the postpartum period has been suggested to influence eye contact behavior and facial expression decoding, we investigated the effects of motherhood on the neural signals of eye contact and perceiving emotion expressions. Event-related brain potentials were recorded from 58 mothers of infants and 56 nulliparas to the presentation of pictures of adult and infant face with happy, angry and neutral expressions. Portraits changed gaze direction (but not expression) midway during the trial; participants detected occasional non-change trials. In line with previous studies, N170 amplitudes were larger to averted than to direct gaze. This effect was more pronounced in both groups to the infant than adult faces. These results indicate a specific increase of sensitivity in the eye contact detecting system for infant faces independent of motherhood status.

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12:00-1:30 PM (2216)

Watching the Brain as It Binds: EEG Alpha/Beta Power Related to Distractor-Response Binding. CHRISTIAN FRINGS, BIRTE MOELLER, and BERNHARD PASTÖTTER, *University of Trier* – Common-coding theories assume that stimuli and responses to them are integrated nto stimulusresponse bindings. These bindings are not restricted to target stimuli but generalize to distractor stimuli, too (distractorresponse binding; DRB). Behavioral DRB is observed in sequential prime-probe reaction time tasks where repetition of the distractor retrieves the previous response. The present study used EEG to examine the relationship of behavioral DRB to brain oscillatory activity in the prime-probe interval. We found that the behavioral DRB effect was negatively related to alpha/ beta power increase over centro-parietal electrodes during the prime-probe interval. Following the view that alpha/beta power increase reflects cortical inhibition, the negative brainbehavior correlation is suggested to reflect enhanced binding of distractors to responses in participants showing a larger behavioral DRB effect. The results support common coding ideas as a central concept in action control.

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12:00-1:30 PM (2217)

Role of Rtpj in Third-Party Punishment: A tACS Study. OKSANA ZINCHENKO, MARIA NIKONOVA, and VASILY KLUCHAREV, NRU Higher School of Economics (Presented by Oksana Zinchenko) (Sponsored by Malen Migueles) - To maintain social order, members of the human societies enforce social norms using social punishment. It could be performed by second-parties, who directly suffer from norm violations, or by third-parties, who are directly unaffected. Neuroimaging studies suggest that the right temporoparietal junction (rTPJ) is crucial for third-party punishment: increased rTPJ activity is associated with reduced punishment of defecting in-group members (Baumgartner et al., 2012). To prove a causal role of the rTPJ in third-party punishment, we applied transcranial alternating current stimulation (tACS) to the rTPJ expecting it would decrease the intensity of third-party punishment during the dictator game. We tested 20 participants (age 18-35), while the sample size was based on the previous study of Brüne et al. (2012). We found differential effects of tACS stimulation at alpha band (F(1,19) = 7.473, p = 0.013) when the period of the game was taken into account: we observed the smaller thirdparty punishment of moderately unfair offers during the first part of the dictator game (p = 0.014) and increased third-party punishment (p = 0,046) during the second part. Email: Oksana Zinchenko, ozinchenko@hse.ru

12:00-1:30 PM (2218)

Modeling the Neural Representation of Rapid Visual Sequences in a Statistical Learning Paradigm. CYBELLE M. SMITH, University of Pennsylvania, ELIZABETH A. KARUZA, Pennsylvania State University, SHARON L. THOMPSON-SCHILL, University of Pennsylvania – Humans can rapidly learn sequential dependencies, but where and how these dependencies are represented in the brain is unknown. As a first step towards developing a neurocognitive model of sequential dependency representation, we reanalyzed a BOLD fMRI dataset (N=16; Karuza, 2014) in which participants implicitly learned statistical dependencies among abstract visual shapes and scrambled images. Images were presented sequentially (SOA=1s), with an underlying triplet structure. A whole-brain searchlight analysis of pattern similarity revealed that regions in occipitotemporal, parietal, and prefrontal cortex showed a correlation structure among the image triplets that was similar to a simple model in which gabor filter features of each image in the triplet are summed. Model fit improved with learning, as shown by increased cluster sizes in later runs. To probe the representation of order info, we identified the relative weighting of the three images in each triplet that best explained neural activity. Left hemisphere regions numerically trended towards more heavily weighting the initial image in each triplet, consistent with more effective use of the initial image to predict subsequent images, and thus reduce their error signal. Email: Cybelle M. Smith, cybelle@sas.upenn.edu

12:00-1:30 PM (2219)

Brief Naps Do Not Remediate Cognitive Deficits Due to Sleep Deprivation. MICHELLE E. STEPAN, ERIK M. ALTMANN, and KIMBERLY M. FENN, Michigan State University (Sponsored by Erik Altmann) - One theory of sleep deprivation posits that deprivation produces domain specific effects on cognition. To better understand the mechanisms through which sleep deprivation impairs cognition, we investigated how the neural correlates of brief naps related to cognitive performance. In the evening, participants completed assessments of memory maintenance (UNRAVEL) and sustained attention (Psychomotor Vigilance Task - PVT) and were randomly assigned to sleep or remain awake. Sleepdeprived participants were randomly assigned to a 60min, 30min, or 0min nap opportunity. In the morning, participants completed UNRAVEL and PVT. Performance in both tasks significantly degraded after sleep deprivation, regardless of nap opportunity. Minutes of slow wave sleep (SWS) was marginally correlated with better memory maintenance, but sleep architecture was unrelated to PVT. These results suggest that sleep deprivation has multiple pathways through which it affects cognition and that memory maintenance is sensitive to SWS but sustained attention may require more sleep to rebound. Email: Michelle E. Stepan, stepanmi@msu.edu

12:00-1:30 PM (2220)

Elucidating the Neural Mechanism by Which Warnings Reduce Misinformation Errors. JESSICA M. KARANIAN, Fairfield University, NATHANIEL RABB, JESSICA P. JIMBO, MCKINZEY G. TORRANCE, CAMILLE CARLISLE, ALIA N. WULFF, AYANNA K. THOMAS, and ELIZABETH RACE, Tufts University - The present study sought to elucidate the neural mechanism by which warnings reduce misinformation errors in mock eyewitnesses. After watching a crime video and taking a test on the details presented in it, 65 participants listened to an audio synopsis of the crime which contained consistent, control, and misleading information. During fMRI, participants were then given another memory test on the details of the crime video. We compared participants who were warned about the veracity of the synopsis either pre-synopsis, postsynopsis, or not warned at all. Both pre- and post-warnings reduced the misinformation effect relative to no-warning. This memory benefit on misleading questions was associated with greater activity in visual cortex, anterior insula, and anterior cingulate cortex (ACC), which suggests that warnings may Email: Jessica M. Karanian, jessicakaranian@gmail.com

12:00-1:30 PM (2221)

Using Task State and Resting State Functional Connectivity to Predict Working Memory Performance. ERIKA J. BAILEY, Wake Forest University, ROBERT G. LYDAY and PAUL J. LAURIENTI, Wake Forest University School of Medicine, DALE DAGENBACH, Wake Forest University - Models based on human brain functional connectivity have been used to successfully predict fluid intelligence and attention performance in participants whose data did not contribute to the model development. The present study compares using task state functional connectivity and resting state functional connectivity to predict performance in the 2-back working memory task. The model based on task state functional connectivity is able to successfully predict working memory in a different sample, but the model based on resting state data is not. The failure of the resting state model stands in contrast to our previous efforts using that approach to predict episodic memory performance. Implications of this for our understanding of brain organization and cognitive processes are considered.

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12:00-1:30 PM (2222)

Neural Substrates of Audio-Visual Temporal Recalibration -- An ERP Study. XIAOLIN MEI and XIANG WU, Sun Yat-Sen University (Presented by Xiaolin Mei) - The brain is always exposed to information from different senses. Despite the temporal lags between modalities in both physical transmission and neural processing, the brain is capable of adjusting for the temporal lag and formulating a coherent perception of the world. This temporal recalibration is beneficial to human survival, whereas its neural substrates remain unclear. Here, we monitored event related potentials (ERPs) while participants were exposed to a 200-ms audio-visual or visual-audio lag for 2.5 minutes in an adapt-test task. The results showed that peak amplitudes of the N1 and P2 in response to the auditory stimuli significantly reduced in the starting 30 s and remained at a relatively stable level in the remaining period of the adapt phase. In contrast, peak amplitudes of ERP components in response to the visual stimuli were not influenced by adaptation. These findings advanced the current understanding of temporal recalibration in two aspects. First, audio-visual temporal recalibration is supported by modulating neural representation of auditory but not visual stimuli. Second, temporal recalibration occurs with a fast time course. Email: Xiang Wu, wuxiang3@mail.sysu.edu.cn

12:00-1:30 PM (2223)

Neural Entrainment Indexes Statistical Learning in Children. CHRISTINE MOREAU, MARC F. JOANISSE, and LAURA J. BATTERINK, University of Western Ontario (Sponsored by Laura J. Batterink) - The ability to learn language relies on our sensitivity to structural patterns in speech. Statistical learning (SL) is proposed as a mechanism for discovering these patterns through incidental exposure and is present from early infancy through adulthood. However, studies of SL have largely relied on assessing learners' explicit memory after learning has occurred. This approach does not capture the time course and process of SL per se. To better understand the dynamics of SL, we assessed SL in 8- to 12-year-old children using a direct EEG measure of learning, which captures changes in neural entrainment to words embedded in a continuous artificial language stream. SL was also assessed post-learning using implicit and explicit behavioural tests. The neural entrainment results demonstrated rapid implicit learning of word-level information, while post-learning behavioural tasks demonstrated significant syllable prediction and recognition of the trisyllabic words. These results replicate previous findings in adults and hint to the possibility that children and adults use similar language learning mechanisms. Importantly, this is the first study to demonstrate that neural entrainment is a sensitive indicator of SL in children.

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12:00-1:30 PM (2224)

Sustained Slow Wave Activity and Alpha Oscillations Index Distinct Aspects of Working Memory Storage. GISELLA K. DIAZ, EDWARD K. VOGEL, and EDWARD AWH, University of Chicago (Sponsored by Edward Awh) - Oscillatory brain activity in the alpha-band (8-12 Hz) and slow wave EEG activity have been implicated in the maintenance of information in visual working memory (WM). Using EEG recorded from parietooccipital electrodes, we replicated the finding that increasing WM load leads to monotonic increases in the amplitude of a sustained negative slow wave and monotonic declines in alpha power. Although these signals both track WM load, they appear to play separable functional roles (Fukuda et al., 2015). Our hypothesis is that the negative slow wave is an item-based signal that tracks the number of individuated representations in WM, while alpha power indexes the locations of the stored items. Here, we use sequentially presented displays to manipulate the total number of locations occupied by a given number of memoranda. Alpha power, but not slow wave activity, tracked variations in the total number of locations when the number of items stored was held constant. By contrast, slow wave activity tracked the total number of items stored, but did not vary with the number of locations occupied by the memoranda. The current work provides additional evidence that alpha power and the negative slow wave track distinct aspects of WM storage. Email: Gisella K Diaz, gisella@uchicago.edu

12:00-1:30 PM (2225)

(Morpho)Syntactic Priming as a Mechanism for Rapid Automatic Syntax Parsing: ERP Evidence. MARIA ALEXEEVA, NRU Higher School of Economics, ANDRIY



MYACHYKOV, Northumbria University, BEATRIZ BERMUDEZ-MARGARETTO, NRU Higher School of Economics, YURY SHTYROV, Aarhus University, REBECCA MORSS, National Center for Atmospheric Research, KEVIN ASH, University of Florida (Sponsored by Phill Higham) -Automatic syntax processing is a well-established phenomenon, in neuroimaging usually linked to early negative ERP responses (e.g., ELAN) for (morpho)syntactic violations. Its mechanisms, however, remain largely unknown. There are two main hypotheses: (1) morphosyntactic priming and (2) error detection. To test these accounts, we used a non-attend passive design with visual distraction and recorded ERPs to spoken Russian pronoun-verb phrases (e.g., 'she/he/I walked[masc/ fem]') that were congruent or incongruent with regard to subject-verb gender agreement as well as the same control verbs presented in isolation. Three pronouns and ten different verbs spoken in male and female voices were used. ERPs were analysed using rmANOVAs and cluster-based permutation analysis. Results revealed both early and late syntax-processing indices, including early negativity at 80 ms, ELAN and LAN for agreement violation, suggesting an automaticity of syntactic parsing. The largest ELAN responses were obtained for isolated verbs (> incorrect > correct phrases) suggesting that its reduction for congruent phrases is based on syntactic priming between words/morphemes, potentially mediated by syntactic links formed during previous experience.

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Poster Session III Friday Evening Room 517 B Viewing 4:00-7:30 PM, Author Present 6:00-7:30 PM

POSTER SESSION III

6:00-7:30 PM (3001)

Recognition of Time Flow in Response Time. KYUNGIL KIM, Ajou University, SENA KIM and SUNGYUB HONG, Ajou University - According to the Internal Clock Model, our internal clocks move only when we pay attention. So, people will not be aware of how much time has passed if they pay attention to another stimulus. This explanatory study investigates the effect of showing people how much time has passed while they carry out a task on their performance using The Stroop Task. One group of participants were shown how much time has passed in every five minutes during the task, while those in the other group were not. In results, there was no difference between the groups with a total accuracy of about 95 percent. However, people in the control group who could not check the time performed significantly faster, by 112ms. Thus, people seem to perform worse if there is a clear indication of the time flowing, especially in the task of inhibition. Email: Sena Kim, senahihi@ajou.ac.kr

6:00-7:30 PM (3002)

On the Utility of the Dynamic Framework of Mind Wandering. ANNA P. SMITH, KEVIN O'NEILL, and PAUL SELI, Duke University - Christoff et al.'s Dynamic Framework argues that a necessary defining feature of mind-wandering is a lack of thought constraint. One concern with this view is that the thought-constraint dimension might be redundant with another, extant dimension: intentionality. Another concern is that ontask thoughts (which seem antithetical to mind-wandering) may sometimes lack constraint, which would awkwardly imply that these task-focused thoughts qualify as mind-wandering. Thus, the utility of the Dynamic Framework's argument rests upon a demonstration that (a) the thought-constraint dimension is distinct from the intentionality dimension, and (b) on-task thoughts do not lack constraint. We explored these possibilities by indexing the constraint, intentionality, and task-relatedness dimensions of thought during completion of a laboratory task. Our results indicate a dissociation of the intentionality and thought-constraint dimensions. However, we find that 64% of "on-task" thoughts lack constraint, which, by the Dynamic Framework's argument, suggests that 64% of "mind-wandering" consists of task-relevant mentation.

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6:00-7:30 PM (3003)

What Is in the Focus of Attention? The Role of Conceptual Activation in Memory Formation. MICHAEL G. ALLEN and TIMOTHY F. BRADY Q, University of California, San Diego (Sponsored by Timothy Brady) - Recent work has revealed that participants frequently fail to remember information (the identity of a letter) immediately after processing it (finding the letter in a set of numbers to report its color). This 'attribute amnesia' (Chen & Wyble, 2015) challenges the idea that information processed within the focus of attention should be available for report, suggesting that such information may be encoded but not consolidated into memory. This assumes that the mapping between stimuli and concepts activated in their apprehension is straightforward; it is possible, however, that different levels of relevant concepts may be activated depending on context and task demands. When searching for a letter amongst non-letters, it may be that only the concept 'letter' is activated, and not the letter identity. We tested attribute amnesia for specific stimuli across different target categories and distractor sets and found that recall of identity information is dependent on ease of target category recognition and the information required to distinguish targets from distractors. Report of consciously perceived information thus depends not just on which stimuli are within the focus of attention, but on what concepts their perception activates. Email: Michael G. Allen, mgallen@ucsd.edu

6:00-7:30 PM (3004)

What Do Online Thought Probes of Mind Wandering Measure? - A State-Trait Analysis. JAN RUMMEL, DIRK HAGEMANN, LENA STEINDORF, and ANNA-LENA SCHUBERT, Heidelberg University - Mind wandering is often assessed with trait questionnaires but also with experience sampling methods. For the latter, participants are periodically asked to report on their thoughts while being engaged in some kind of daily activity or laboratory task. Thought probes typically ask whether participants had been on- or off-task at the very moment before being probed and it has been argued that this method assesses state- rather than trait-specific mind wandering. To test this assumption, we probed participants' thoughts during two laboratory tasks (2-back, text reading) and, six months later, invited the same participants to perform the same tasks for a second time. Results from a latent statetrait analysis showed that mind wandering was very time stable, with state-specific variance components being close to zero. Replicating previous cross-sectional findings, the model's trait mind wandering factor was correlated with factors of working memory and fluid intelligence. Additionally, substantial taskspecific variance was observed. We conclude that thought probing seems to capture trait rather than state variance in mind wandering but that it is also reflective of task-specific modulations of mind-wandering tendencies.

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6:00-7:30 PM (3005)

Reduced Re-Reading of Garden-Path Jokes During Mindless Reading. HAN ZHANG, University of Michigan, CHUYAN QU, Beijing Normal University, KEVIN MILLER and KAI SCHNABEL CORTINA, University of Michigan - We examined whether mind-wandering can lead to reduced re-reading using the so-called "garden-path jokes". In a garden-path joke, the reader's initial interpretation is violated by the final punchline, creating a semantic incongruity that needs to be resolved (e.g., "My girlfriend has read so many negative things about smoking. Therefore, she decided to quit reading."). The incongruityresolution process is supported by going back and re-reading text prior to the punchline. We asked participants to read jokes and non-funny controls embedded in filler texts and assessed intentional and unintentional mind-wandering using thought probes. Eye-tracking results showed that jokes read without mind-wandering elicited more re-reading from the punchline compared to the non-funny controls. Jokes read without mindwandering also showed a recall advantage over the non-funny controls. However, the additional eye movement processing and the recall advantage of jokes were reduced during mindwandering. These findings indicate that mind-wandering may hinder re-reading when re-reading supports the resolution of higher-level comprehension difficulties.

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6:00-7:30 PM (3006)

Attention Restraint, Working Memory Capacity, and Mind Wandering: Do Emotional Valence or Intentionality Matter? ALEXANDRA C. NIETO, Nova Southeastern University, MATTHEW S. WELHAF, University of North Carolina at Greensboro, ANUM MALLICK and JONATHAN B. BANKS, Nova Southeastern University - Attention restraint appears to mediate the relationship between working memory capacity (WMC) and mind wandering (Kane et al., 2016). Prior work has identified two dimensions of mind wandering-emotional valence and intentionality. However, less is known about how WMC and attention restraint correlate with these dimensions. The current study examined the relationship between WMC, attention restraint, and mind wandering by emotional valence and intentionality. A confirmatory factor analysis demonstrated that WMC and attention restraint were strongly correlated, but only attention restraint was related to overall mind wandering, consistent with prior findings. However, when examining the emotional valence of mind wandering, attention restraint and WMC were related to negatively and positively valenced, but not neutral, mind wandering. Attention restraint was also related to intentional but not unintentional mind wandering. These results suggest that WMC and attention restraint predict some, but not all, types of mind wandering.

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6:00-7:30 PM (3007)

The Role of Feature Ambiguity in Repetition Blindness. IRINA M. HARRIS, *The University of Sydney*, WILLIAM G. HAYWARD, *University of Hong Kong*, SALLY ANDREWS, *The University of Sydney* – Repetition blindness (RB) is the failure to detect and report a repeated item during rapid serial visual presentation (RSVP). The RB literature reveals consistent and robust RB for word stimuli, but somewhat variable RB effects for pictorial stimuli. We directly compared RB for object pictures and their word labels, in the same participants. Experiment 1 used a small pool of stimuli presented several times throughout the experiment. Significant RB was found for both words and pictures, although it was more pronounced for words. Experiment 2 used a large pool of stimuli that only occurred once during the experiment. Words again showed significant RB, but pictures showed significant repetition facilitation. We hypothesize that an experimental context that contains high levels of overlap in visual features prevents the formation of distinct object-level episodic representations, resulting in RB. Email: Irina M. Harris, irina.harris@sydney.edu.au

6:00-7:30 PM (3008)

Relearning as a Necessary Precondition for the Unconscious Processing of Newly-Learned Category Exemplars. REED MORGAN, KARYA ANYA OZMEN, KIAN O'CONNOR, DEMARKO FLANAGAN, ARIEL PRUYSER, and RICHARD L. ABRAMS, Loyola Marymount University - Unconscious category priming can be obtained robustly from overlearned (i.e. common) words foregrounded in contextual memory by being practiced shortly before a priming task; this is a wellestablished finding. We show here that for newly-learned words, unconscious priming only occurs when the newly-learned words are similarly foregrounded in contextual memory through practice (relearning) just before their appearance as masked primes. In Experiment 1, a set of novel category exemplars (rare fish and flower names) yielded unconscious priming after a brief reminder practice session that followed 24 hours after the initial learning of the words. In Experiment 2, no priming was observed from the same rare fish and flower names when they were learned for the first time immediately prior to the priming task. In Experiment 3, no priming was observed when the rare fish and flower names were tested in a priming task six hours after the initial learning session, but without the brief reminder practice session. Taken together, these results suggest that unconscious lexical systems are recruited quickly into the processing of newly-learned words, but require the same foregrounding into contextual memory as do overlearned words.

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6:00-7:30 PM (3009)

Motivation and Framing as Potential Mediators of Age-Related Changes in Mind Wandering. JESSICA L. NICOSIA, DAVID A. BALOTA, and JULIE M. BUGG, Washington University in St. Louis (Sponsored by Janet Duchek) - Despite declines in attentional control, older adults paradoxically report less mind-wandering (MW) than younger adults. Two potential explanations include: (1) older adults are more motivated than younger adults to perform MW tasks; (2) older adults view self-reported MW more negatively than younger adults. We attempted to manipulate MW in younger and older adults via motivation (Experiment 1) and positive framing (Experiment 2). In Experiment 1, participants performed the Sustained Attention Response Task (SART) with or without an incentive aimed at improving performance and reducing MW. The results indicated that younger adults' SART performance improved (e.g., decreased CoV, increased no go accuracy) in the motivation compared to the control condition but neither group reported reduced MW in the motivation condition. In Experiment 2, participants performed the SART with or without
positive framing instructions aimed at increasing MW reports. The positive framing instructions increased self-reported MW but SART performance was unaffected. The results indicate that motivation may influence objective measures while framing may influence self-report measures; however, neither accounts for age differences in MW.

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6:00-7:30 PM (3010)

Unskilled Metaperception Among and Aware: ROBERT Low and High Performers. TIRSO, Texas A&M University, LISA GERACI, University of Massachusetts Lowell (Sponsored by Joseph Orr) Prior work suggests that low performers make overconfident metacognitive judgments because unlike high performers, they lack awareness of their true level of ability. However, more recent work suggests that despite making seemingly overconfident metacognitive judgments, low performers do in fact possess some awareness of their true level of ability similar to high performers. The current studies further investigated low and high performers' knowledge of their own abilities by comparing low and high performers' views of their cognitive abilities (metacognitive judgments) to how they believe others view their abilities (metaperceptive judgments). Participants predicted their performance in absolute and relative terms as well as what they thought others in general (Study 1), another individual they know well (Study 2), or a new acquaintance (Study 3) would predict for them before taking a general intelligence test. Results suggested that low and high performers possess similarly accurate insight into how others view their abilities.

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6:00-7:30 PM (3011)

Phenomenology and Brain Measures During Cognitive Trance: A Case Study. OLIVIA GOSSERIES, University of Liege, CORINE SOMBRUN, TranceScience Research Institute, AUDREY WOLFF, AURORE THIBAUT, LEANDRO SANZ, and FEDERICO RAIMONDO, University of Liege, MATTEO VECCHIO, University of Milan, RAJANIKANT PANDA, University of Liege, FRANCIS TAULELLE, TranceScience Research Institute, AUDREY VANHAUDENHUYSE and STEVEN LAUREYS, University of Liege (Sponsored by Nathan Rose) - Cognitive trance is a volitional and self-induced modified state of consciousness inherited from shamanic traditional practices that can be practiced by any individual. Little is known about its phenomenology and neural correlates. We here describe the case of an expert who underwent restingstate EEG, TMS-EEG and FDG-PET during normal wakefulness and cognitive trance. Phenomenological questionnaires were filled after each session. EEG analyses included spectral power and complexity measures. For TMS-evoked potential, diversity index and global mean field power were computed. For PET, global brain metabolism difference between rest and trance was measured. During trance, the participant felt more joy, visual imagery, body image, and an altered experience. She reported higher absorption and dissociation, with five-fold time-scale distortion. Trance was associated with increased spectral

power in all frequency bands. Entropy also showed an increase, especially in posterior regions. TMS-EEG showed modifications in cortical reactivity, while PET revealed no significant difference in brain metabolism. Cognitive trance induced a modified state of consciousness characterized by changes in behavior and neurophysiological processes.

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6:00-7:30 PM (3012)

Egocentric Temporal Order Bias: How Vantage Shapes Perceptual Experience. TY Y. TANG (Graduate Travel Award Recipient) and MICHAEL K. MCBEATH, Arizona State University (Sponsored by Michael McBeath) - In a previous study, we examined if conscious experience is biased to perceive one's own action-events to occur prior to simultaneous external events, like deciding if you or your opponent last touched a basketball heading out of bounds. Participants made temporal-order judgments comparing their own touch to externally generated stimuli. Across all manipulations, we observed a robust bias for participants to experience their own touch as occurring first, even when both sensory events were simultaneous. This phenomenanon, referred to as the Egocentric Temporal Order (ETO) bias, demonstrates that disagreements in temporal order judgments may arise from individuals experiencing differing accounts of subjective time. This finding is interpreted as bias arising from an egocentric frame of reference. Across 5 experiments, we show that this effect is multisensory and independent of cue. This work builds upon existing literature of intentional binding and subjective perception, demonstrating how vantage and perspective can shape the perceptual experience of time. Email: Ty Y. Tang, tytang24@asu.edu

6:00-7:30 PM (3013)

Is Awareness Necessary to Process Visual Configurations? A Continuous Flash Suppression Study of Kanizsa Squares. MARIA NIKIFOROVA, University of Massachusetts, Amherst, DAVID E. HUBER and ROSEMARY A. COWELL, University of Massachusetts, Amherst (Sponsored by David Huber) - In Sadil et al. (2019), participants learned the configuration of a visual object under continuous flash suppression (CFS), i.e., without awareness of object identity. Conversely, Harris et al. (2011) found that participants could not judge the orientation of an illusory Kanizsa triangle under CFS. However, the configuration of the triangle might be processed even when orientation is unavailable for conscious report (analogous to processing object configurations without awareness of object identity). Instead of orientation, we asked participants whether four pacmen presented under CFS formed a square or were misaligned; accuracy was at chance. Next, we presented pacmen for longer durations, measuring participants' latency to become aware of the configuration. Some participants consistently experienced faster "breakthrough" for illusory contours (formed by aligned pacmen) appearing within-hemifield, whereas others experienced faster breakthrough when illusory contours crossed the vertical midline. These individual differences suggest that configural information, including illusory contours, is processed under CFS.

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6:00-7:30 PM (3014)

Measuring Meta-Awareness with the Metronome Counting Task. THOMAS ANDERSON and NORMAN A.S. FARB, University of Toronto Mississauga (Sponsored by Paul Seli) - How do you find something you don't know you've lost? Attention drifts despite the intention to focus, yet we eventually notice our displaced attention. This "noticing" is the restoring of meta-awareness (MA), which allows us to engage resources to overcome attentional drift. Measuring MA loss is unintuitive. To consciously report MA loss, a participant would need MA of losing MA: a paradox. We sought to validate a new measure of MA loss. We will present data on the recently-developed Metronome Counting Task (MCT). The MCT is a behavioural continuous performance task wherein response variability implicitly indicates task-disengagement. Participants tap along to a steady beat while counting the beats and self-catch if they lose count. Results indicate that response patterns diverge before participants detect their MA loss. This study informs the time-course of the sustained-attention cycle. EEG and fMRI versions of the MCT will also be discussed. Future development of behaviour-independent detection of MA would have practical applications catching inattention before it detrimentally derails performance. Modelling meta-awareness will also be inherently informative for understanding the neural correlates of consciousness.

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6:00-7:30 PM (3015)

The Effect of Mindful Breathing and Imagery Meditation on Visual Imagery Ability. CALEB ELDRIDGE and STEPHANIE A. KAZANAS, Tennessee Technological University - Individual differences in mental imagery suggest some range in an individual's ability to create vivid mental images. Some may benefit from an increased ability to form clear mental images, especially if they work in a creative profession. Existing research shows that various forms of meditation improve brain functioning associated with visual imagery, and other research has shown these meditation techniques to improve cognitive abilities that aid in visual imagery. The current research studied two forms of meditation-mindfulness of breath and imagery meditation-and their effects on visual imagery ability in college students. In a week-long experiment, participants performed one of several forms of meditation for 20-minutes each day. After one week, those who performed only mindful breathing showed increased visual imagery vividness. Additional factors, including OSPAN, were also considered within this context. Email: Caleb Eldridge, cdeldridge43@students.tntech.edu

6:00-7:30 PM (3016)

The Effects of Attentional Control Settings on the Simon Effect. COLIN R. MCCORMICK and RAYMOND M. KLEIN, *Dalhousie University*, JASON IVANOFF, DAVID DEBLY, and

LINDSEY WESTCOTT, Saint Mary's University (Sponsored by Jason Ivanoff) - Responses that spatially correspond with the location of a stimulus are often faster, and more accurate, than spatial responses that conflict with stimulus location. This 'Simon Effect' is thought to be the result of a natural tendency to respond to the location of stimulus. Little is known, however, about the role attentional control settings play in a Simon task. In a pair of experiments, we explored the influence of inhibitory control on the Simon Effect by varying the ratio of peripheral cues (no-go stimuli) to targets that are known to elicit a Simon effect (E1), and by comparing the magnitude of the effect when there were either peripheral cues before each target in a block, or strictly target stimuli (E2). The results indicate that the magnitude of the Simon Effect within the experimental conditions do not differ, suggesting that inhibitory attentional control settings do not impact this unintended process. Email: Colin R. McCormick, colin.mccormick@dal.ca

6:00-7:30 PM (3018)

Task Format Modulates the Relationship Between Reading Ability and Stroop Interference. LAOURA ZIAKA, University of Oslo, DIMITRA SKOTEINOU, University of Athens, ATHANASSIOS PROTOPAPAS, University of Oslo (Sponsored by Athanassios Protopapas) - Previous research has shown that Stroop interference and reading ability are negatively related, with higher reading skills associated with less interference. A direct link between interference and the speed of inhibition of the task-irrelevant dimension (i.e., word) has been proposed to explain this relationship. If that were the case then there should be little effect of the format of the Stroop task, that is, whether stimuli are presented simultaneously (multi-item version) or individually (single-item version). Here we reexamine data from six experiments using single-item and multi-item Stroop tasks and their relationship to reading measures. Our results indicate that reading performance is primarily related to the multi-item version of the Stroop task and not to the single-item version. These findings question the direct link between inhibition and interference as an interpretation of the reading-interference relationship. We argue that cascaded processing of successive items, and the ability to monitor and control this process, is the cognitive mechanism responsible for the relationship between reading and interference and the explanation of why it is only evident in the multi-item version of the task. Email: Laoura Ziaka, laoura.ziaka@isp.uio.no

6:00-7:30 PM (3019)

Looking to the Past When Engaging Control in the Present. ABHISHEK DEY (Graduate Travel Award Recipient) and JULIE M. BUGG, *Washington University in St. Louis* (Sponsored by Julie Bugg) – Prominent models of cognitive control assume that conflict and the probability of conflict are signals that modulate attention. Not fully understood is how far back the control system "looks" to learn about and calculate the probability of conflict. The present study examines the time scale of conflict learning. Aben, Verguts and Van den Bussche (2017) developed a model that captured differences in time scales between flanker lists that differed in their probability of conflict. We applied their model to investigate time scales in two additional conflict tasks in which the list-wide probability of conflict differed. Our findings replicated those of Aben et al. suggesting that time scale patterns for list-level control may be task general. We subsequently modified their model to examine time scales for items with different probabilities of conflict within the same list. The modified model failed to detect any differences in time scales for items within the same list. This may imply the control system looks equally far back for items within a list. Potential explanations for the time scale patterns and the implications they have for theories of control are discussed.

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6:00-7:30 PM (3020)

Item-Specific Attentional Control Under Working Memory Load. JIHYUN SUH, ISAAC BINDERT, LAHARI VUPPALADHADIAM, SARAH MATNEY, LAUREN SEIDMAN, and JULIE M. BUGG, Washington University in St. Louis - Item-specific control refers to the adoption of different attentional control settings for items associated with differing probabilities of conflict. In a Stroop task, the Stroop effect is smaller for items that are frequently incongruent compared to items that are frequently congruent, reflecting heightened versus relaxed attentional control settings, respectively. In the present study, we investigated whether item-specific control is automatic in the sense of operating under a concurrent working memory load. Participants performed a picture-word Stroop task where the proportion congruence was manipulated across item categories (i.e., animals). After completing the first block involving only the Stroop task, a working memory task (verbal or spatial) was introduced asking participants to maintain either 1-digit (or 2 locations in spatial task) or 6-digits (or 8 locations) while they continued to perform the Stroop task. The working memory load manipulation was effective as mean Stroop latency was slower under high than low load. The results showed a typical item-specific proportion congruence effect regardless of the working memory load. Our findings demonstrate that item-specific control might be operating in an automatic manner.

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6:00-7:30 PM (3021)

Stimulus Salience and Probability of Salience in Visual Search. MYEONG-HO SOHN and XINYUE DENG, George Washington University (Presented by Myeong-Ho Sohn) - The stimulus salience matters: a salient target speeds up the target detection, but a salient distractor slows it down. This study examined the top-down influence on the stimulus salience effect. In three experiments, participants looked for a target letter (T or L) among six circularly arranged letters. The stimulus salience was manipulated so that (a) all six letters were presented in white (neither salient), (b) the target letter was in red (target salient), (c) one of distractor letters was in red (distractor salient), or (d) the target and one distractor were in red (both salient). In Experiment 1, the effects of target salience and distractor salience were additive whether salience conditions were randomly intermixed or blocked. In Experiment 2, the additive effect did not differ whether the expectancy of salient distractor was either high or low. In Experiment 3, the salient distractor produced an over-additive interference effect when the expectancy of salient target was high, but an additive effect when the expectancy was low. These results suggest that, while salient distractor cannot be suppressed with top-down knowledge (i.e., probability), its interference effect can vary with top-down knowledge of the target.

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6:00-7:30 PM (3022)

Using Peripheral Information When the Eyes Are Busy. MONIQUE CROUSE and TRAVIS L. SEYMOUR, University of California, Santa Cruz (Sponsored by Travis Seymour) - Its known that attention to a location can be accomplished without an eye movement, aka covert attention (Posner, 1980). However, the Premotor Theory of attention argues that attention is generated via oculomotor programs and even when covertly attending, an eye movement is still being planned, it's just not executed (Rizzolatti, Riggio, Dascola, and Umiltá, 1987). Additionally, when performing tasks naturally, the eyes seem to be the determining factor in where people attend (Findlay and Gilchrist, 2003) making covert attention, regardless of its origin, an artifact of simplistic experiments. The current research shows that at least some people can covertly attend to a briefly presented peripheral warning even though it occurs when the eyes are busy looking at a to-be-discriminated target. Others appear not to use this warning, even when doing so would be more efficient. We explore possible individual differences and strategic biases as possible correlates of this difference. Email: Monique Crouse, mcrouse@ucsc.edu

6:00-7:30 PM (3023)

Brain Stimulation Mitigates the Vigilance Decrement: A tDCS and EEG Study. ELISA MARTÍN-ARÉVALO, University of Granada - We used a recently developed task, which simultaneously measures executive and arousal vigilance to investigate its modulation by High-Definition Transcranial direct current stimulation (tDCS). We stimulated different brain regions over the right fronto-parietal attentional network. Participants (n= 90) were randomly assigned to one of three groups (frontal stimulation, parietal stimulation, and sham condition). All of them performed - in combination with the tDCS protocol - an attentional networks task (ANTI-Vea) suitable to measure both vigilance's components together with three typical attentional functions: phasic alertness, orienting, and executive control. EEG was also measured during the first and the last block of trials. A Vigilance decrement was observed across time on task in the control (sham) group, for both arousal (increase in mean RT and variability) and executive vigilance (decrease in accuracy). Furthermore, an increase in alpha power was also observed in occipital electrodes in the last block of trials. Both the executive vigilance decrement and the increase in alpha power were nevertheless mitigated in the electrical stimulations groups. Possible implications of the observed results will be discussed.

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6:00-7:30 PM (3024)

Same Data, Diverging Conclusions: Perceptual Salience Drives Data Interpretation. CINDY XIONG (Graduate Travel Award Recipient), Northwestern University, LISANNE VAN WEELDEN, Utrecht University, STEVEN L. FRANCONERI, Northwestern University (Sponsored by Paul Reber) - You'd hope that people would interpret data objectively, but the process is likely riddled with biases. We explored one potential bias - the way that the visual representation of data might make some relations or patterns more salient than others. We showed participants graphs depicting neutral topics, where a focus on one type of pattern ('global' features) in the graph suggested one potential outcome, while other focusing on another pattern ('area' features) suggested the opposing outcome would be most probable. Viewers indicated which graph patterns they found most visually salient before they predicted the outcome. We found sustained individual differences in how differences in perceived visual saliency of those patterns drove viewers' conclusions, even across graph types. Viewers who perceived global patterns as the most salient made differing predictions compared to those who saw area patterns as more salient. Preliminary results in a follow-up study adding perceptual priming of these two patterns provided stronger evidence for a causal role of perceptual salience. This suggests that the graph interpretation processes could be influenced by bottomup processes where perceived feature saliency impact viewer conclusions.

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6:00-7:30 PM (3025)

Alerting and Cognitive Control in the Attention Network Test. TODD A. KAHAN and HANCHEN ZHANG, Bates College – Previous research has found a greater congruency effect when participants are alerted in the Attention Network Test relative situations where participants are not alerted. However, the interaction between alerting and congruency that has been reported with arrow stimuli as well as in the Simon task does not generalize to the Stroop task (Schneider, 2019). To test the hypothesis that the interaction between alerting and congruency requires pre-existing directional associations, Experiment 1 (N = 40) used numeric stimuli since numbers are associated with spatial directions (i.e., the SNARC effect). Result show the typical interaction between congruency and alerting. Experiment 2 (N = 40) further tested this by replacing numeric stimuli with characters that do not have directional associations and the interaction disappeared. Together these data support the proposal that the interaction between alerting and congruency requires pre-existing directional associations. Email: Todd A. Kahan, tkahan@bates.edu

6:00-7:30 PM (3026)

Auditory Temporal Negative Priming. LOUISA M. SLOWIACZEK, *Bowdoin College*, TODD A. KAHAN and ALEXA C.M. HARRISON, *Bates College* – Kahan, Slowiaczek, Altschuler and Harrison (2019, JEP:G) reported a visual temporal negative priming effect (in contrast to identity or spatial negative priming). The current experiments extend this effect to the auditory modality. Experiment 1 included paired prime and probe trials. Prime trials included auditory random presentation of a target (bird chirp), a distractor (dog bark) and two neutral (computer beep) sounds. Probe trials included auditory random presentation of the target and three neutral sounds. Participants indicated the temporal location of the target sound in the sequence of four sounds on the probe trial. On 80% of the trials they also indicated the location of the distractor on the prime trial. Results showed an increase in response time when the location of the probe's target was the same as the location of the prime's distractor - an auditory temporal negative priming effect. In Experiment 2 a visual and auditory context that matched or mismatched on the prime and probe trial were presented to determine whether matched context would influence the degree of temporal negative priming. While context did not influence response time in Experiment 2, auditory temporal negative priming was replicated.

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6:00-7:30 PM (3027)

Decoding the Spatial Locus of Voluntary Visual Attention from ERPs. PÉNÉLOPE PELLAND-GOULET, PIERRE JOLICOEUR, and MARTIN ARGUIN, Université de Montréal (Sponsored by Martin Arguin) - The N2pc ERP component is an index for the spatial deployment of visual attention. The SPCN is an ERP component that is linked to working memory. We ask whether N2pc and SPCN can track visual attention along a finely graded horizontal spatial extent made of a normally spaced (i.e. as in words) letter string. Participants were required to attend a particular letter within a row of four letters horizontally centred at fixation. Trials consisted of a central arrow cue indicating the location to attend, followed 750ms later by a string of random letters with random onset times and presented for 33ms each. After a 2-second delay, participants typed the letter that was at the cued location. The time windows for the N2pc and SPCN components peaks were selected at posterior electrodes. This signal was fed into a Support Vector Machine classifier in order to predict the locus of visual attention and the presence vs absence of visual attention at a particular location. The locus of attention was predicted with a 52% accuracy and the presence vs absence of attention vas predicted with a 73% accuracy (chance levels of 25% and 50% respectively). Interestingly, SPCN offered a better decoding accuracy than N2pc when used alone. Email: Pénélope Pelland-Goulet, penelope.pellandg@gmail.

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6:00-7:30 PM (3028)

The Role of Explicit Learning and Feedback in the Temporal Adjustment of Attention in Rapid Serial Visual Presentation Tasks. MATTHEW S. JUNKER, *Southern Illinois University*, ZHUORAN ZHANG, *Washington University in St. Louis*, JACQUELINE C. SHIN, *Indiana State University* – The goal of the current study was to investigate the role of explicit learning in temporal attention. In four rapid serial visual presentation (RSVP) tasks, target positions were manipulated in a consistent manner. In Experiment 1, participants searched for a target which appeared in one of two fixed positions for up to three sessions. Learning was measured in terms of accuracy and

measures of attentional amplitude, delay, and variability. Rate of improvement was positively correlated with explicit learning of target timing. In Experiment 2, the target always appeared in the same position for 10 sessions. Learning increased for all sessions, perhaps reflecting explicit learning of target timing. In Experiment 3, some participants were given explicit instructions that the target timing would be consistent. Explicit learning was positively correlated with RSVP performance; however, the causal role of explicit learning could not be determined. In Experiment 4, some participants were given feedback. Explicit learning was correlated with performance only when feedback was given. Taken together, the results show that explicit learning of temporal information, facilitated by feedback, is crucial in the adaptation of attentional dynamics.

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6:00-7:30 PM (3029)

Cued Control over Task-Switching. EMILY R. COHEN-SHIKORA, JIHYUN SUH, and JULIE M. BUGG, Washington University in St. Louis - In prior work, we used the pre-cued lists paradigm to examine the effects of advance information on subsequent Stroop task performance (Bugg, Diede, Cohen-Shikora, & Selmeczy, 2015). Participants completed short lists of trials and a pre-cue informed or did not inform (uncued condition) them about the upcoming list composition (i.e., mostly congruent/mostly incongruent). Participants consistently used cues to relax, but not heighten, control. In the current study, we applied the pre-cued lists paradigm to investigate cued control over task switching. Short lists of letter and number judgment trials were presented in mostly repeating or mostly switching lists. List type was cued or uncued, and the primary dependent variable was switch cost. If the mostly repeat cue is used to relax control, switch costs should be increased relative to uncued (mostly repeat) lists; if the mostly switch cue is used to heighten control, switch costs should be decreased relative to uncued (mostly switch) lists. We found that the precue only increased switch costs for the mostly repeat condition, indicating that participants again used cues to relax but not heighten control. We discuss implications of this work for task switching and cognitive control.

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6:00-7:30 PM (3030)

The Role of Attentional Set in Processing Prime Identity and Response in Single-Prime Negative Priming. HSUAN-FU CHAO, *Chung Yuan Christian University* – Single-prime negative priming refers to the findings that, after briefly presenting a single stimulus as a prime, it takes longer time to respond to a following probe target when the primed stimulus is repeated as the probe target. The present study investigated the effect of attentional set on prime processing in single-prime negative priming. The results showed that when the prime matched the distractor set, single-prime negative priming occurs. In addition, the identity associated with the prime was inhibited while the response associated with the prime was activated. On the other hand, when the prime matched the target set, the effect of single-prime negative priming did not surface, although identity inhibition and response activation were still observed. Finally, when the prime matched the neutral set, the single-prime negative priming effect surfaced again. Intriguingly, response activation was not observed while there was a significant effect of identity inhibition. These results suggest that the attentional set affects how the identity and response associated with a single prime are processed. Email: Hsuan-Fu Chao, hfchao@cycu.edu.tw

6:00-7:30 PM (3031)

Cognitive Control Processes for Stimulus-Based Conflict Resolution. YE-EUN KIM, JONG MOON CHOI, HA EUN CHOI, and YANG SEOK CHO, Korea University - The present study was conducted to investigate how cognitive control resolves stimulus-based conflict. In three experiments, participants were to perform two stimulus-based conflict tasks alternatively in a trial-by-trial manner with aimed-movement responses. The congruency sequence effect (CSE) was examined in response time (RT) and movement time (MT) data. In Experiment 1, a significant cross-task CSE was obtained between two integrated versions of the Stroop tasks in the MT data but not in RT data. This result was replicated in Experiment 2, in which participants were to perform two separated versions of the Stroop tasks. In Experiment 3, in which an integrated version and a separated version of the Stroop task were performed alternately, a significant cross-task CSE was obtained between them in the RT and MT. These results provide evidence against the idea that stimulus-based conflict is resolved by changing attentional weights of the task-relevant or irrelevant dimension. Email: Ye-Eun Kim, delukamine@naver.com

6:00-7:30 PM (3032)

Conflict-Based Modulations in Attentional Control Influence Semantic Processing. BLAIRE J. WEIDLER, Towson University, EMILY R. COHEN-SHIKORA, Washington University in St. Louis, BRIANNA HICKS and ALLISON MCKINNON, Towson University - The level of conflict in the environment modulates attentional control. Specifically, Stroop color-naming interference is reduced in mostly incongruent (MI) lists relative to mostly congruent (MC) lists. However, it remains unclear what mechanism is supporting this modulation in control. Based on the idea that changes in prioritization of word reading and/or color processing might support the effect, we used a secondary lexical decision task (LDT; with a word frequency manipulation in one experiment) to assess semantic processing across MC and MI lists. Participants completed a Stroop task (with a list-wide conflict manipulation) and occasionally performed an LDT on non-colored letter strings. We observed robust conflict-based modulation in attentional control despite the intervening LDT. Additionally, LDT RT and the word frequency effect were modulated by the interaction between the list's PC and whether the prior trial was congruent or incongruent.

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6:00-7:30 PM (3033)

Contingency Learning, yet Adaptation to Conflict Frequency: Evidence from the Item-Specific and List-Wide Proportion-Congruent Paradigms. GIACOMO SPINELLI and STEPHEN J. LUPKER, University of Western Ontario (Sponsored by Lucia Colombo) - In the Stroop task, congruency effects are larger in mostly-congruent situations than in mostly-incongruent situations (e.g., words typically presented in their congruent vs. incongruent colors - "item-specific" paradigms - or blocks mostly composed of congruent vs. incongruent stimuli - "listwide" paradigms). However, the nature of these proportioncongruent effects is debated. They might be produced by adaptation to conflict frequency (i.e., a focusing of attention in mostly-incongruent situations) and/or a more general learning mechanism of word-response contingencies (e.g., anticipate a blue response when the word RED appears). At present, attempts to directly dissociate the two processes indicate no role for conflict adaptation if contingency learning is possible. We re-examined this conclusion in item-specific and list-wide proportion-congruent paradigms where contingency learning was possible but could be dissociated from conflict-adaptation processes. Evidence for conflict-adaptation processes emerged in both paradigms, suggesting that the presence of contingencies in the task does not prevent the implementation of conflictadaptation strategies.

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6:00-7:30 PM (3034)

Switching Between Tasks on Different Hands Reduces the Congruency Sequence Effect. LAUREN GRANT, University of Michigan, SAVANNAH COOKSON, University of California, Berkeley, DANIEL WEISSMAN, University of Michigan (Sponsored by Daniel Weissman) - The congruency effect in distractor-interference tasks is smaller after incongruent trials than after congruent trials. However, the boundaries of this congruency sequence effect (CSE) remain unclear. Motivated by prior findings, we hypothesized that task sets play an important role in determining these boundaries. To test this hypothesis, we manipulated the structure of a prime-probe task across four experiments. Specifically, we investigated whether changing the cognitive operation and/or the hand participants use to respond in consecutive trials, either of which may alter the task set participants employ, creates a boundary for the CSE. Consistent with our hypothesis, Experiment 1 revealed a smaller CSE when consecutive trials involved both a change in cognitive operation and responding hand. In contrast, Experiments 2 and 3 revealed no change in the CSE when only the cognitive operation (Experiment 2) or the responding hand (Experiment 3) changed. Finally, Experiment 4 indicated that across-experiment differences in the stimuli we employed could not explain these outcomes. These findings support the task set hypothesis and further reveal the specific conditions under which task set boundaries form.

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6:00-7:30 PM (3035)

Physical Activity in Virtual Environments: Effects on Cognitive Performance. RACHEL J. HOPMAN, NICOLE E. LOGAN, CHARLES H. HILLMAN, and ARTHUR F. KRAMER, *Northeastern University* – Previous research shows a 20-minute bout of moderate intensity aerobic exercise increases allocation of attention and improves cognitive processing for tasks requiring inhibitory control. Likewise, brief exposures to natural environments improve attention allocation, working memory performance, and cognitive flexibility. However, few studies have measured the effects of environmental exposure during exercise on cognitive functioning. Preliminary evidence shows exercising in a virtual natural environment while completing a navigation task moderately improves working memory and inhibition more so than completing the task while seated. This ongoing investigation dissociates the effects of acute exercise from environmental exposure on attention allocation and working memory performance. In this withinsubject design, measurements of working memory, attention inhibition, and creativity were sampled during five sessions comparing acute exercise to rest and nature to urban virtual environments compared to baseline performance. We predict acute exercise in natural environments will show greater benefits to attention and working memory compared to acute exercise in urban environments or virtual reality exposure at rest.

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6:00-7:30 PM (3036)

Expecting the Unpredictable: On the Influence of Temporal Action Effect Predictability on Anticipatory Saccades. ANTON KOGER and CHRISTINA U. PFEUFFER, Albert-Ludwigs-Universität Freiburg (Sponsored by Roland Pfister) - If we expect our action to evoke a certain consequence at a specific location, our eyes already saccade to the anticipated location of this future consequence. Crucially, when the delay of this consequence (action effect) is temporally predictable, our eyes move earlier/later in accordance with its timing. Here, we systematically varied the temporal predictability of action effects. Per half of the experiment, action effect delays were temporally predictable (500 ms) versus temporally unpredictable (200/500/800 ms at random). Participants anticipatorily saccaded towards their actions' future effects more often, indicating increased monitoring, when action effect delays were temporally unpredictable rather than predictable. Furthermore, the temporal predictability of action effect delays also affected saccade latencies and their dispersions. Participants' ability to estimate the durations of the three action effect delays (temporal reproduction task) correlated with the degree to which their eye movements were affected by the temporal predictability of their actions' consequences.

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6:00-7:30 PM (3037)

Toward Objective Evaluation of Working Memory in Visualizations: A Case Study Using Pupillometry and a Dual-Task Paradigm. LACE M.K. PADILLA, University of California, Merced, SPENCER C. CASTRO, P. SAMUEL QUINAN, IAN RUGINSKI, and SARAH CREEM-REGEHR, University of Utah – Cognitive science has established widely used and validated procedures for evaluating working memory in numerous applied domains, but surprisingly few studies have employed these methodologies to assess claims about the impacts of complex visualizations on working memory. The lack of information visualization research that more directly measures working memory may be due, in part, to the absence of cross-domain methodological guidance tailored explicitly to the unique needs of visualization research. As a case study, we illustrate several methods for evaluating working memory in a visual-spatial aggregation task with geospatial data. The results show that the use of dual-task experimental designs (simultaneous performance of several tasks compared to single task performance) and pupil dilation can reveal working memory demands associated with task difficulty and dualtasking. In a dual-task experimental design, measures of task completion times and pupillometry revealed the working memory demands associated with both task difficulty and dualtasking. Pupillometry demonstrated that when participants completed a more difficult task and when multi-tasking their pupils were significantly larger.

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6:00-7:30 PM (3038)

A Narrow Distribution of Spatial Attention Improves Both Spatial and Temporal Acuity. REBECCA K. LAWRENCE, Australian National University, MARK EDWARDS and STEPHANIE C. GOODHEW, Australian National University (Sponsored by Jim McAuliffe) - The classic zoom-lens metaphor of spatial attention suggests that compared to a broad distribution of attention, narrow attention improves all aspects of visual perception. However, recent research suggests that endogenous changes in the spatial distribution of attention selectively influence spatial acuity, while having no effect on temporal acuity. Critically, this research has only used unfilled shapes to manipulate attention distribution. These unfilled shapes may cause attention to be deployed as an annulus (a ring), rather than causing attention to spread across the entire region of the shape. Therefore, the current study developed a new method to manipulate attention, which encouraged attention spreading, rather than an annulus deployment of attention. Specifically, different sized global-motion stimuli were used to manipulate attention distribution, and the effect of this on spatial and temporal acuity was measured. Using this new method of attention induction, narrowing attention improved both spatial and temporal acuity. Consequently, future research should carefully consider the way in which spatial attention is manipulated when testing the effects of attention distribution on visual perception.

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6:00-7:30 PM (3039)

Top-Down Influences on the Ternus Illusion Revisited. MENGZHU FU, University of Nebraska-Lincoln, LOGAN L. MILLER and MICHAEL D. DODD, University of Nebraska-Lincoln – Previous studies have shown that the percept of element and group motion are influenced by both timing (ISI), as well as more top-down factors such as semantic or scenebased information (Fu & Dodd, Psychonomics 2018). In the present study, we demonstrate the impact of three new Ternus manipulations (auditory grouping via pitch, visual grouping via object context, depth in Virtual Reality) on the perception of apparent motion. Moreover, we examine the methodological influence of display type given pilot data in our lab indicating far earlier group motion for certain displays in the absence of any context. In all of the conditions the perception of motion was influenced though the manner in which this occurred was not equivalent across conditions. The results have important implications for theories of apparent motion as well future investigations with alternate presentation types (VR). Email: Michael D. Dodd, mdodd2@unl.edu

6:00-7:30 PM (3040)

What Constrains Attention to Visual Features in Working Memory? ANDRA ARNICANE (Graduate Travel Award Recipient) and ALESSANDRA S. SOUZA, University of Zurich (Sponsored by Alessandra S. Souza) - Working memory (WM) maintains a limited amount of information available for ongoing processing. WM severe capacity limits can be mitigated by attention. For example, directing attention to the location of tobe-retrieved information improves memory accuracy. Recent studies showed that this benefit is also obtained by cueing one feature of an item (e.g., its shape) to allow for the retrieval of another feature (e.g., its color). Across two experiments, we attempted to replicate this feature-cue benefit and failed. We then conducted four additional experiments to assess whether the feature-cue benefit depends (a) on the type of feature that serves as the cue (i.e., color or orientation), (b) the type of comparison baseline, (c) number of cued objects (one vs. two), and (d) the complexity and number of features used as cues. Robust feature-cue benefits were observed under a-c. Cue complexity, however, appears to limit feature-cue benefits (d). Email: Andra Arnicane, arnicanea@gmail.com

6:00-7:30 PM (3041)

Multiple Object Tracking: The Perception of Object Ensembles. REEM ALZAHABI and MATTHEW S. CAIN, Tufts University - Multiple object tracking studies consistently reveal attentive tracking limits of approximately 3-5 items. Is this capacity limit fixed, or is it modified depending on factors related to grouping and ensemble perception? How flexible are the heuristics of organization when one is perceiving a group of objects? Is there a quota that must be met so that the perception of multiple objects is considered a group? First, we show that group perception is holistic, such that individuals can successfully track approximately 4 groups of objects, regardless of the number of items that group is composed of (2, 4, or 8 objects). Then, we investigate the extent to which group formation is driven by cohesion and common fate. We consider group tracking performance as cohesion declines, as well as the robustness of group perception when common fate motion is not in complete unison.

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6:00-7:30 PM (3042)

Information About the Similarity and the Clarity of Letters Are Processed in Serial, but Without a Fixed Order. MARC-ANDRÉ GOULET and DENIS COUSINEAU, *University of Ottawa* (Sponsored by Denis Cousineau) – When asked to compare two stimuli participants are in average faster to respond "Same" than "Different", an effect coined the *fast*- same. The dual-process theory argues that information about similarity is processed in priority over any other type of information, causing the fast-same effect. We tested this serial architecture of cognitive processes using a double factorial paradigm, suitable for a Systems Factorial Technology (SFT) analysis. Twenty participants completed a task in which they compared two letters, which we varied on two dimensions: the similarity and the clarity of the letters. Their task was to indicate if the second letter was the "Same" (ranging from identical and clear to similar and slightly blurry) as the second letter or if it was "Different" (if the stimuli were either dissimilar or very blurry). The SFT results show that most participants processed the information in serial, but in a mixed order. In other words, for some trials, participants processed similarity first, and for some other trials, they processed clarity first. This implies that participant indeed process information in serial in the Same-Different task, but that it does not cause the fast-same effect. Email: Marc-André Goulet, mgoul101@uottawa.ca

6:00-7:30 PM (3043)

Missing the 'Big Picture': Counting Interferes with Preschool and Kindergarten Learning of Spatial Configurations. KUGEN K. NAIDOO, MANAL ZAFAR, SOPHIA INOSHITA, XIAOLU QIU, S. R. NARAHARISETTY, KOMAL GONDAL, STEPHEN I. TUCKER, and NICHOLAS C. HINDY, University of Louisville - Children can use alternative strategies to identify the number of objects in a set: they can count the individual objects (featural processing) or they can recognize the overall arrangement (configural processing). This study explores how these different strategies influence the speed and accuracy of numerosity judgments among children in preschool and kindergarten. Over the course of a month, participants played a multi-touch game on iPads which displayed configurations of 1 to 10 objects moving across the screen. Video recordings were used to split participants into categories based on their predominant processing strategy. Reaction time was positively correlated with the number of objects on the screen when participants tended toward featural processing, while accuracy was negatively correlated with numerosity when participants tended toward configural processing. Overall, participants who tended to count the individual objects within each pattern showed less improvement in reaction time and accuracy across the training period.

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6:00-7:30 PM (3044)

Visual Long-Term Memories of Negatively Defined Objects. CARRICK C. WILLIAMS and SYDNEY SCHABACKER, *California State University, San Marcos* (Presented by Carrick Williams) – To explain the difficulty in processing negated propositions, some theories propose that both the negated and the affirmative versions of the proposition are maintained. Because of the importance of the identifying object label to the representation of visual long-term memories (VLTM), we wanted to examine whether defining an object (e.g., a red apple) via a negated label (e.g., an apple that is not yellow) would alter the memory representation that is stored in VLTM. Would a non-yellow apple be thought of as red? Target objects were encoded with affirmative or negative labels, followed by interfering objects that could also be affirmatively or negatively identified. Results for affirmatively defined targets replicated previous work showing effects of retroactive interference. However, negatively defined targets were also interfered with, suggesting that when encoding a memory, people recode negatively defined targets as the affirmative option when representing the object in VLTM.

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6:00-7:30 PM (3045)

Looming and Receding Effects on the Attentional Blink. STACIE LAFKO and VAUGHN BECKER, Arizona State University (Sponsored by Vaughn Becker) - When the second of two targets (T2) is presented within 500 milliseconds of the first target (T1), participants are unable to report T2, representing the attentional blink (Shapiro, Arnell, and Raymond, 1997). What happens to the attentional blink effects when T1 is looming or receding? To answer this question, participants were subjected to three conditions: looming T1, receding T1, and no movement T1 (control). When T1 was looming, it led to significantly greater recall at lags one and two and significantly worse recall at lags three and four, when compared to the control. The number of lags represents the number of distractors presented between the two targets. When T1 was receding, there were no significant differences when compared to the control. These results are consistent with Franceroni and Simon's (2003) findings that looming objects strongly capture attention while receding objects do not. Additionally, the looming results represent an increase in lag-1 sparing effects (performance is temporarily enhanced) (Olivers, 2007) at the expense of resources allocated to consolidating T2 when presented at longer lags.

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6:00-7:30 PM (3046)

Visual Imagination Shares Similar Capacity Limits with Visual Working Memory. CRISTINA R. CEJA (J. Frank Yates Student Travel Award Recipient) and STEVEN L. FRANCONERI, Northwestern University (Sponsored by Steven Franconeri) - Visual working memory research shows that observers can store visual features (e.g., colors) of around 3-4 objects at a time. If asked to recall the locations of each colored object (i.e., testing detection of color-location swaps instead of color replacements), this capacity drops to 2-3 objects. If the objects move (e.g., 90 degree rotation from encoding to test displays), this capacity drops even further to around 1 colorlocation pairing. Might these capacity measures from objective visual working memory tasks parallel subjective and objective reports in instances without exogenous input? In this study, observers were asked to store colored objects (1-4 items), and then imagine them rotating or translating (10, 60, 90, or 120 degrees). Subjective reports of task difficulty and objective estimates of performance replicated previous working memory capacity limit estimates. Recalling color locations across simple transformations (rotation or linear translation) was increasingly difficult for displays containing unique (as opposed to homogeneous) colors and for greater set sizes. These data suggest that similar capacity limits extend across both visual working memory and visual imagination.

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6:00-7:30 PM (3047)

The Outlier Paradox: The Role of Iterative Ensemble Coding in Discounting Outliers. MICHAEL LEWIS EPSTEIN, The Graduate Center CUNY, JAMES QUILTY-DUNN, University of Oxford, ERIC MANDELBAUM and TATIANA ALOI EMMANOUIL, Baruch College and The Graduate Center CUNY - Ensemble perception-the perception of group statistical properties-is known to be resistant to outlier noise. However, this resistance is somewhat paradoxical: how can the visual system determine which stimuli are outliers without already having derived statistical properties of the ensemble? A simple solution would be that outliers are detected through iterative computations that identify items with high deviance from the mean and reduce their weight in the representation over time. Here we tested this hypothesis. In experiment 1, we found evidence that outliers are discounted from mean orientation judgments, extending previous results from faces. In experiment 2, we tested the timing of outlier rejection by having participants perform speeded judgments of sets with or without outliers. We observed significant increases in reaction time when outliers were present and found that this was not simply due to increased range. In experiment 3, we tested the timing by which outlier noise reduces over time. We presented sets for variable exposure durations and found that noise decreases linearly over time. Altogether these results suggest that ensemble representations are optimized through iterative computations aimed at reducing noise.

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6:00-7:30 PM (3048)

The Effects of Inhibition of Return on Signal Detectability and Confidence Judgments. JASON IVANOFF, TORRYE F. KEEN, and PRUDENCE BULL EMMANUEL, Saint Mary's University, XINGJUAN LIU, Jilin Agricultural University -Inhibition of return (IOR) refers to the relative slowing of responses to targets appearing at peripherally cued locations compared to responses to targets at uncued locations. After nearly 35 years of research there remains some controversy over the effect of IOR on perceptual processing in the absence of saccadic restrictions by way of eye monitoring. The purpose of the present study was to examine the impact of IOR on (i) the ability to detect a target embedded in external noise when both share space and time and (ii) metacognitive ability (i.e., confidence in the ability to judge target presence). In a peripheral cueing experiment with post-target confidence ratings we varied signal-to-noise ratio (SNR) and duration of the target. Although SNR and target duration had substantial impacts on target detectability, the effect of IOR was relatively modest. Moreover, SNR improved metacognitive efficiency while IOR slowed both target detection and confidence

judgments. Although these findings demonstrate a small (yet measurable) impact of IOR on perception, the foremost effect of IOR is on the speed of decision-making.

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6:00-7:30 PM (3049)

Does Spatial Location Influence Same-Different Judgments of Facial Identity and Expression? MAURRYCE D. STARKS and MICHELA PARADISO, The Ohio State University, ANNA SHAFER-SKELTON, University of California, San Diego, ALEIX M. MARTINEZ and JULIE D. GOLOMB, The Ohio State University (Sponsored by Julie Golomb) - The "spatial congruency bias" is a phenomenon showing that two objects presented sequentially are more likely to be judged as being the same object if they are presented in the same location (Golomb et al., 2014 JEP:Gen). Here, we examine whether this bias persists for higher-level object characteristics such as facial identity and emotional expression. Two faces were sequentially presented in various on-screen locations, and subjects were asked to make same-different judgments on emotional expression or facial identity. In Experiment 1, subjects were more likely to judge two face stimuli as having the same emotional expression if they were presented in the same location. However, this bias was not found in Experiment 2, when subjects had to make the same judgment across two faces that differed in facial identity. In Experiment 3, a spatial congruency bias was found when subjects made judgements on facial identity, even across faces displaying different emotional expressions. These findings suggest a possible difference between the binding of identity vs. emotion to spatial location.

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6:00-7:30 PM (3050)

Individual Differences in Early Versus Late Selection for Binding: The Trait of Autism-Spectrum Disorder Varies the Stage of Attentional Selection with Temporal Regularity. TETSUKO KASAI, SHIIKA MAKINAE, AKIHIRO FUJI, and TESHIRO IMIYA, Hokkaido University, KEIICHI KITAJO, National Institute for Physiological Sciences - The stage on which attentional selection occurs was a long-lasting debate, which has been resolved in terms of task load or competition for resources. Here we found another factor, trait of autism-spectrum disorder (ASD), in the context of effects of stimulus-driven temporal attention on binding and by indexing event-related potentials (ERPs). Twenty healthy young adults participated in a task to discriminate the direction of infrequently-presented arrows at the center of task-irrelevant Kanizsa figure (KF) or control stimuli, which were briefly presented with constant (regular) or varied (irregular) time intervals. Behavioral facilitation by regularity was found only for higher AQ (ASD quotient) group. In ERPs, peak amplitudes of P1 and N1 for regular KF were correlated with AQ score, indicating decreasing early integration; however, the higher AQ group showed accelerated processing speed at later regular KF processing, reflected by shorter target P3 latency. Frequency analyses during blocks indicated weaker entrainment as AQ score increased. These

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results may reflect that higher cognitive processes compensated less efficient attentional functions that operate early visual integration in individuals with higher ASD trait. Email: Tetsuko Kasai, tetsu@edu.hokudai.ac.jp

6:00-7:30 PM (3051)

Continuous Multi-Level Signal Detection in a Complex Dynamic Visual Search Task. KATHLEEN G. LARSON, SAMUEL J. JOHNSTON, RIK WARREN, and ROBERT EARL PATTERSON, Air Force Research Laboratory - Many real-world surveillance tasks (e.g., mall security, lifeguarding, air traffic control) require visual search of bustling crowds over long periods of time. The observers must make decisions based on what they see. Typically, the quality of sustained attention declines over time, which has been coined the vigilance decrement (e.g., Warm, 1984). In our study, we simulated views of a virtual village area as provided by an overhead surveillance drone, i.e., a compound over-watch scenario. The task consisted of searching for primary and secondary targets. One interesting feature is that some items were secondary targets only if a primary target was present. Otherwise, the same items were distractors. The results generally showed a learning curve but a vigilance decrement was dependent on task parameters. We present signal detection measures, accuracy, response times, and possible explanations.

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6:00-7:30 PM (3052)

The Effects of Alerting and Task Demands on "Priming of Pop-Out". NADJA JANKOVIC, THOMAS M. SPALEK, and VINCENT DI LOLLO, Simon Fraser University (Sponsored by Vincent Di Lollo) - In a pop-out visual-search task, reaction times (RT) are faster when the target on Trial N shares the distinguishing feature with the target on Trial N-1. This "priming of pop-out" was first reported by Maljkovic and Nakayama (1994) using a compound search task in which a coloured oddball was to be singled out and a detail of its shape was to be reported. In Experiment 1 (E1) we examined the effect of alerting (faster RT following an alerting stimulus) on priming of pop-out in a compound task. The alerting stimulus was a brief flash presented just before the search display on half the trials in each experiment. Non-compound search tasks were used in E2 and E3. To eliminate the search component in the task, observers in E2 made a simple RT to a solitary target whose colour matched that of the previous target on half the trials. To reduce the decision demands relative to E1, observers in E3 responded only when an oddball was present. E1 revealed priming but no alerting. E2 revealed alerting but no priming. E3 revealed alerting, but priming was in evidence only in the alerting condition. We interpret these results as arising from changes in the observer's mental set.

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6:00-7:30 PM (3053)

Retinotopic Mapping of Attention Field in the Human Brain. MARTINE DESJARDINS, *Université du Québec à Montréal*, JEAN-MARC LINA, *École des Technologies Supérieures*, LOUIS DE BEAUMONT, *Hôpital du Sacré-Cœur de Montréal*, JEAN-FRANCOIS GAGNON, Université du Québec à Montréal, PIERRE JOLICOEUR, Université de Montréal (Sponsored by Roberto Dell'Acqua) - Stimuli located in the lower visual field are processed more accurately than stimuli in the upper VF. N2pc, a lateralized visual ERP reflecting visual spatial attention, is larger for attended stimuli in the LVF compared with UVF. The causes of this VF effect on N2pc amplitude remain poorly understood. Our goal was to clarify the upper/lower VF effects in attentional tasks by mapping their cortical sources using MEG for 16 subjects performing a visual search task. Ten stimuli, including 1 singleton were placed on an imaginary circle centered at fixation with 8 possible target locations. Source suggested attention-related activity was stronger in the fusiform when the target was closer to the horizontal meridian. Activation was stronger when the target was in the LVF compared with the UVF in the superior parietal lobule. Activity found in a more restricted selection on the occipital superior gyrus also showed a polarity reversal for targets in the UVF versus the LVF. Our results highlight the importance of considering target positions in attention experiments and can provide a partial answer regarding the effects observed between the UVF and LVF, which appear, in part, to reflect different retinotopic mappings of stimuli in VFs.

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6:00-7:30 PM (3054)

Face-Name Learning in Older Adults: Does Participant Awareness Change the Hyper-Binding Effect? SALWA AMÉLIE MANSOUR, University of Colorado, Colorado Springs, LORI E. JAMES and JESSICA BAYNARD-MONTAGUE, University of Colorado, Colorado Springs (Sponsored by Lori James) - Hyper-binding involves implicitly encoding associations between target pictures and simultaneously occurring distractors because of an age-related inhibitory deficit. Weeks, Biss, Murphy, and Hasher (2016) provide evidence for a beneficial effect of hyper-binding on older adults' name learning: They found that older, but not young adults', recall of face-name pairs benefited from previous exposure to distractor names. We conducted two replication experiments in which our results were inconsistent with hyper-binding. We suspected that participants intentionally attended to the distractor names and that this somehow affected our results and those obtained by Weeks et al. (2016). In the present study, we experimentally manipulated the visibility of distractor names during the first task to understand how awareness might alter the hyper-binding effect. Results again did not replicate Weeks et al. (2016) but provided support for the notion that name visibility plays a role in the hyper-binding effect.

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6:00-7:30 PM (3055)

Examining the Effects of Computerized Cognitive Training and High Outcome Expectancy in Healthy Older Adults: An Electrophysiological Study. SHEIDA RABIPOUR, *McGill University & Douglas Research Institute*, MEGGAN PORTEUS, KENNETH CAMPBELL, and PATRICK S.R. DAVIDSON, *University of Ottawa* (Sponsored by Rebekah Smith) – Decline of cognitive functions such as working memory and inhibition often occurs in aging. Computerized cognitive training (CCT) is an appealing but increasingly controversial approach purported to prevent or delay such decline. Notably, questions remain about the practical benefits and mechanisms of CCT programs. Here we expanded our previous work to investigate electrophysiological correlates of training on a commercially available CCT program (Activate) after being primed to have high expectations of outcomes. Seventy-four healthy older adults were recruited and randomly assigned to 25 sessions of CCT or an active control condition. Participants demonstrated high engagement with the tasks and satisfaction with their assigned program. Our results nevertheless suggest few, if any, post-training changes in performance on neuropsychological and behavioural tasks of working memory and inhibition. Moreover, we found pre- to post-training changes in eventrelated potentials indexing cognitive monitoring and control that were similar in the two groups. Together, our findings suggest little impact of specialized CCT on behavioural or electrophysiological measures of cognitive function. Email: Sheida Rabipour, sheida.rabipour@mail.mcgill.ca

6:00-7:30 PM (3056)

Perspective-Taking Across the Lifespan: The Role of Executive Functions. ELISABETH E.F. BRADFORD, VICTORIA E.A. BRUNSDON, and HEATHER J. FERGUSON Q, University of Kent - Perspective-taking plays a key role in daily life, allowing successful interactions to occur. Studies have shown that even in adulthood, there is a great deal of variability in successful engagement of 'Theory of Mind' (ToM) capacities, with individual differences in general social and cognitive skills predicting success. This study examined some of the cognitive factors that may influence successful ToM engagement, and how this relationship changes across the lifespan. A large (N = 305) continuous age sample of participants between 10-86 years completed a ToM task assessing their ability to attribute (false-) beliefs to themselves and other people, alongside four executive function tasks (inhibition, working memory, setshifting, planning). Results revealed a significant effect of age on ToM engagement, with increased egocentric processing with advancing age. This decline was not the result of domaingeneral cognitive declines (no significant relationship with executive functioning), indicating specific social-cognitive declines in ToM with advancing age.

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6:00-7:30 PM (3057)

Ageing and Emotion Perception from Robot Facial Expressions: Changes in Perceptual Style, or Cognitive Ageing? ETSUKO T. HARADA and DAICHI SUGAWARA, *University of Tsukuba*, RYUTA TAKAWAKI, *Toyo University*, SATORU SUTO, *Shizuoka University* – Sixteen robot face animations were presented to participants, 8 older- and 8 younger- adults, and participants were asked to evaluate the robot's emotion by the affect grid and 4-points scales on four emotions (pleasure, anger, surprise, and sadness). Results from the affect grid evaluation showed that younger adults perceived stronger emotion from the robot animation than from human facial expressions (from a previous study), while older adults



showed weaker perception than human face. Looking at quantitative data of each emotional dimension, younger participants showed a single dimensional evaluation, while older adults expressed perceptions of mixed emotions. Those results implied that younger adults responded to the robot facial expression as a sign, or trying to read a single emotional category, while older adults responded to the robot face just like to a human. Effects of cognitive ageing or some cohort factors of elders may affect their perception of robot facial expressions. Email: Etsuko T. Harada, etharada@human.tsukuba.ac.jp

6:00-7:30 PM (3058)

Creativity Remains Stable Through 55 Years of Age. PHILIP A. ALLEN and KATHY LAMANCUSA, University of Akron, JAMES R. HOUSTON, Middle Tennessee State University, MICHELLE L. HUGHES, University of Akron, MEI-CHING LIEN, Oregon State University (Presented by Philip Allen) -Simonton (1984, 1997) suggested that creativity increases from younger to middle adulthood peaking at 42 years of age, and then decreasing (i.e., a quadratic effect of creativity). We tested this claim using the Torrance Tests of Creative Thinking-Verbal (TTCT) and the Ruff Figural Fluency Test (RFFT) on two age groups with similar levels of education: 75 younger adults (18-28 years of age, 40 women) and 84 middle-aged adults (35-54 years of age, 67 women). Using Regression analyses, the whole sample showed significant linear, quadratic, or cubic trends for the TTCT and the RFFT, but the middle-aged adults did not. These results suggest that creativity continues to increase up to approximately forty years of age as suggested by Simonton but remains stable until the mid-fifties—which is counter to the predictions of Simonton's model.

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6:00-7:30 PM (3059)

Older Adults Show Impairments in Learning New Spatial Environments Compared to Younger Adults. ALEXIS V. OYAO, University of Arizona, MARTHA R. FORLOINES, University of California, Davis, ANNA ROBERTSON, MATTHEW D. GRILLI, and ARNE D. EKSTROM, University of Arizona (Sponsored by Arne Ekstrom) - The aging brain has been associated with impairments in spatial navigation (Begega et al., 2001; Gallagher & Pelleymounter, 1988; Lykoyanov et al., 1999; Moffat, 2009); with studies in rodents suggesting instability in spatial representation for multiple environments (Barnes et al., 1997). Here, we tested the extent to which older adults could form representations of novel environments while maintaining those for well-learned environments. Participants watched videos of three different virtual environments, each containing six stores, and then made judgments about the relative distances of stores within the environment. Older adults performed worse overall than younger adults, but, as indicated by an age-by-condition interaction effect, showed a particular deficit in learning the new environment. Thus, compared to younger adults, older adults maintained their existing representation for a well-learned environment more readily, but struggled to learn the new environment. These findings suggest that part of the well-established deficits in navigation in older adults may relate to difficulty in acquiring and representing novel environments.

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6:00-7:30 PM (3060)

Looking Towards the Future: Written Narratives Predict Loneliness in Older Adults. AKI-JUHANI KYRÖLÄINEN and VICTOR KUPERMAN, McMaster University - Loneliness, defined as a discrepancy between an individual's achieved and desired degree of social relationships, has been shown to be harmful for both physical and mental well-being. As loneliness is often stigmatized, we investigate the automatic and non-invasive identification of loneliness in older adults from their personal written narratives. Amazon's Mechanical Turk was used to recruit 298 older adults (55+) to write about an imagined personal event that will take place in the future. Within participants, loneliness was assessed using the Three-Item-Loneliness Scale. A gradient boosting machine was trained on word co-occurrences extracted from the narratives to predict the loneliness score. Preliminary results demonstrated that written narratives contain linguistic markers that can predict loneliness. This is the first study to demonstrate that the future outlook of an older adult is affected by degree of loneliness and this can be estimated in a non-invasive way through text analysis.

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6:00-7:30 PM (3061)

Investigating the Relationship Between Reserve and Cognitive Ability on Brain Activity Patterns During Episodic Encoding and Retrieval Across the Adult Lifespan. ABDEL ELSHIEKH and SIVANIYA SUBRAMANIAPILLAI, McGill University, SRICHARANA RAJAGOPAL and STAMATOULA PASVANIS, Douglas Mental Health Institute, ELIZABETH ANKUDOWICH and NATASHA MARIA RAJAH, McGill University - The ability to remember associations between encoded items and their contextual setting generally declines with age. Yet, some older adults show minimal signs of memoryrelated decline. This may stem from individual differences in reserve, allowing some individuals to compensate for age-related decline through differential recruitment of brain regions. In this fMRI study (N=154), we tested whether reserve was associated with greater functional compensation in the aging brain. We used Behaviour Partial Least Squares (B-PLS) analysis to examine how age, retrieval accuracy, and a proxy measure of reserve (i.e., education and IQ), impacted brain activity patterns during context memory encoding and retrieval. We also conducted a secondary B-PLS to explore whether higher cognitive ability was associated with additional compensatory patterns not accounted for by our reserve measure. Our results showed that higher cognitive ability, but not reserve, was associated with better context memory performance and with task-specific compensatory responses in ventral visual, temporal, and fronto-parietal regions in advanced age. This demonstrates that compensation may be related to differences in cognitive ability rather than education or IQ.

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6:00-7:30 PM (3062)

Effects of Age on Flashbulb Memories: A Meta-Analysis. KRISTI S. MULTHAUP, SARAH J. KOPP and LAURA E. SOCKOL, Davidson College (Presented by Kristi Multhaup) - This meta-analysis investigated age-related differences in flashbulb memories, which are vivid autobiographical memories for the circumstances in which one learns of a distinct event. A systematic literature review identified 17 studies comparing younger adults (< 40 years old) to older adults (> 60 years old). After exclusion of outliers and correction for publication bias, findings suggest a small-to-moderate decrease in overall flashbulb memory scores in older adults compared with younger adults (Hedges' g = -0.41, p < .001). Effect size was not moderated by study characteristics. Secondary outcomes included canonical categories of flashbulb memories and encoding and rehearsal variables associated with flashbulb memory formation. Age-related differences were found only for memory of ongoing activity (k = 9, Hedges' g = -0.24, p < .05) and investment in the flashbulb event (k = 4, Hedges' g = 0.69, p < .001). These findings are consistent with age-related decline in flashbulb memories.

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6:00-7:30 PM (3063)

Age Differences in Value-Directed Learning, Memory, and Memory Monitoring of Emotional Words. LIXIA YANG, SAYED SODOURI, and SHANNY FOO, Ryerson University, SARA NICOLE GALLANT, Ryerson University & University of South California (Presented by Lixia Yang) - Research has revealed an age-associated positivity effect in memory, with older adults remembering more positive and/or less negative information than young adults. However, little work has been done on age differences in perceived value of emotional information and whether such differences affect what we remember and how we monitor our memory. In the current study, we examined age differences in 1) value assignments to emotional and neutral words and 2) value-directed learning and memory monitoring of the corresponding words. Using a modified value-directed memory paradigm, 24 young and 24 older participants completed the following tasks: 1) a prospective judgement of learning task in which participants assigned a unique value to 12 emotional and neutral words in each of the four blocks; 2) a learning and free recall task in which the same words were studied with their assigned value points and then recalled, to maximize the points; and 3) a cued source monitoring task in which participants recalled the assigned values for all words. Older adults showed a positivity bias (over neutral) whereas young adults showed both positivity and negativity bias (over neutral), particularly in the cued source monitoring.

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6:00-7:30 PM (3064)

No Age Difference in Intersubject Eye Movement Synchrony During Naturalistic Viewing: Implications for Memory. EMILY E. DAVIS, *Brock University*, EMILY CHEMNITZ, *Western University*, TYLER K. COLLINS and KAREN L. CAMPBELL, *Brock University* (Sponsored by Lynn Hasher)

- Much of what we know about aging and memory has been learned through tightly controlled laboratory tasks, but how does age affect memory for more naturalistic stimuli, such as movies? In this study, we measured eye movements in younger and older adults while they watched a Hitchcock film and then tested memory for the movie. Previous work using this film has shown that neural activity during naturalistic viewing becomes less correlated across participants with age (Campbell et al., 2015). The current study aimed to determine if this decreased neural synchrony is caused by a similar decrease in eye movement synchrony, and whether eye movement synchrony is related to memory for the movie. We found no age-related difference in eye movement synchrony, suggesting that older adults look at the same things as younger adults and that age differences in neural synchrony arise at higher levels of processing. There were no age effects on the number of accurate details recalled from the movie, however older adults recalled more false information. In both age groups, higher false recall related to lower synchrony. Overall, the findings suggest that eye movement synchrony during movie watching does not change with age and may relate to memory.

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6:00-7:30 PM (3065)

Stereotype-Threat and Memory in Older Adults: A Negative Association Between Cortisol and Explicit Memory. A. DAWN RYAN and KAREN L. CAMPBELL, Brock University (Sponsored by Karen Campbell) - Stereotype-threat (STT) is characterised by underperformance on a cognitive task following exposure to a relevant stereotype (Spencer, Steele, & Quinn, 1999). There is a widely-held belief that older adults (OA) have declining memory, and research has shown that reminding OA of this stereotype can lead to poorer memory performance (Levy, 2003). While the mechanisms of STT are still not understood, it is possible that activating aging stereotypes in OA induces a stress response, as indexed by salivary cortisol (Sindi et al., 2013). The present study examined the link between cortisol and STT. OA completed an incidental encoding task, followed by STT manipulation. Half the participants read an article in agreement with aging stereotypes while the other half read an article against such stereotypes. Implicit (word stem completion) and explicit (free recall and recognition) memory tests were given. Saliva samples were taken at arrival and after memory testing. STT had no effect on memory or cortisol levels. However, there was a negative correlation between cortisol and the number of words correctly recalled, suggesting that laboratory testing in general may be stressful to OA and occasionally overshadow the effects of STT induction.

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6:00-7:30 PM (3066)

Age-Related Differences in Recall and Recognition: A Meta-Analysis. NATHANIEL R. GREENE, University of Missouri, STEPHEN RHODES, Rotman Research Institute, MOSHE NAVEH-BENJAMIN, University of Missouri (Sponsored by Moshe Naveh-Benjamin) – Adult age differences in memory performance have been reported for both free recall and recognition tasks but are typically larger for recall. This may be consistent with either a general explanation (e.g., decline in memory fidelity) or a specific age-related effect on an underlying process (e.g., search and retrieval from memory). We conducted a meta-analysis of 36 articles reporting 89 direct comparisons of item free recall and recognition performance in younger and older adults. Standardized effect sizes revealed that age differences are larger for recall, Hedges' g = 0.89 (95% CI: 0.75, 1.03), than for recognition tasks, g = 0.54 (95% CI: 0.37, .72). Brinley analyses suggest that distinct functions, differing in intercept, are needed to relate younger and older adults' performance on the two tasks. These findings point to a disproportionate age difference in recall relative to recognition, consistent with theories that posit specific age-related deficits on underlying processes.

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6:00-7:30 PM (3067)

Effects of Prior Knowledge on Young and Older Adults' Memory: A Positive Replication and Extension of Castel (2005). JACK KUHNS, University of North Carolina at Greensboro, DAYNA TOURON, University of North Carolina at Greensboro (Sponsored by Dayna Touron) - Prior knowledge has been shown to reduce or eliminate older adults' associative memory deficits as compared to unrelated information. The factors underpinning older adults' successful memory for information related to prior knowledge are not yet wellunderstood. Work investigating this effect tends to find large effects of prior knowledge for older adults, and variable, sometimes small effects for young adults. Because of the outsized influence that prior knowledge has on older adults' memory, the effect on young adults' memory may have been imprecisely estimated in designs not powered to find these effects. Two wellpowered replications of Castel's (2005, Experiment 1) study of prior knowledge effects on older and young adults' memory were conducted. One direct replication with young and older adults and one conceptual replication with young adults only were conducted. Young adults' level of recall was much lower than originally found, along with much larger effect sizes due to prior knowledge. Results from the replications were consistent with Castel (2005) for older adults but offered unexpected findings for young adults, suggesting the need to more carefully consider young adults' memory in studies of prior knowledge. Email: Jack Kuhns, jmkuhns@uncg.edu

6:00-7:30 PM (3068)

Effects of Group Reminiscence Focusing on Vivid Imagery and Integrative Interpretation on Memory in the Later Life. AYA HOSOKAWA, *Aino University* – Reminiscence is considered an evidence-based intervention for cognitive impairment in the later life. Previous studies investigating effects of group reminiscence with several parts of standardized memory scale found that regular participation in group reminiscence resulted in improvement of performances on several subtests. Simultaneously, content analyses of life narratives suggested that frequently remembered life events were likely to entail vivid imagery representations and integrative interpretations. The results implied that group reminiscence focusing on reviewing individual life with vivid imagery and integrative interpretations might have promoted the improvements in memory. Based on the result, we created instructions in reminiscence encouraging participants to focus on vivid imagery representation and integrative interpretation. To test the effects of our instructions on memory, the current study administrated all 13 subtests from WMS-R. Communityresiding adults at the age from 63 to 92 years participated in a series of bi-weekly intensive group session over a 20-week period and completed pre- and post-tests. The participants improved their performance on 6 subtests after intervention. Email: Aya Hosokawa, a-hosokawa@ot-u.aino.ac.jp

6:00-7:30 PM (3069)

DRM Paradigm and Older Adults: Writing down the Words Reduces False Memories. CHRISTELLE EVRARD, ANNE-LAURE GILET, and FABIENNE COLOMBEL, LPPL - EA 4638 - Older adults are considered particularly prone to false memories (FM). Several studies using the Deese/Roediger-McDermott (DRM) paradigm have examined the potential effects of different items presentation modalities on FM production. The current study investigated another modality, not yet tested with older adults: the "dictation" modality. Nine DRM lists, according to 3 presentation modalities (visual, auditory, and dictation) were submitted to 39 older adults and 39 young adults. A recognition task then followed. The results show that older adults make fewer FM in the dictation modality than in the visual condition, F(1, 76) = 8.05, p = .005, or in the auditory modality, F(1, 76) = 4.57, p = .036. However, this decrease in FM in the dictation modality does not suppress the regularly observed difference between younger and older adults. Several explanations in relation to recent literature on FM and aging are discussed.

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6:00-7:30 PM (3070)

Aging and Binding in Short-Term Memory: Processes Involved in Conjunctive and Relational Binding. CHRISTINE BASTIN, University of Liege, GABRIEL BESSON, University of Liège - In visual short-term binding memory tasks, some studies suggested that aging disrupts relational binding more than conjunctive binding, whereas others report an equivalent age effect in both types of binding. Yet, demands in attentional resources are potentially the greatest for relational short-term binding. In order to test the hypothesis that aging would affect preferentially tasks demanding in controlled processes, we assessed the contribution of controlled and automatic memory processes to relational and conjunctive short-term binding. Groups of young and older adults studied shape-color (Exp.1) or object-color (Exp.2) associations in a relational condition in which items were associated to color patches and a conjunctive condition where color was integrated into the item. Memory for associations was tested with a reconstruction task under inclusion and exclusion instructions (Process Dissociation Procedure). Both experiments showed that the retrieval of both relational and conjunctive associations relied primarily on controlled processes and that age-related differences were

similar in the two conditions. This suggests that age differences in attentional resources may partly explain decreased shortterm binding capacities.

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6:00-7:30 PM (3071)

Diversity Considerations in the Cognitive Neuroscience of Memory, Aging, and Alzheimer's Disease: A Systematic Review and Meta-Analysis. SIVANIYA SUBRAMANIAPILLAI, SHEIDA RABIPOUR, and NATASHA RAJAH, McGill University; Douglas Research Institute (Presented by Sivaniya Subramaniapillai) (Sponsored by Reed Hunt) - Declines in episodic memory are characteristic of healthy aging and late-onset Alzheimer's Disease (AD). Neuroimaging studies have shown that age- and AD-related declines in episodic memory may be related to alterations in medial temporal, prefrontal, inferior parietal and ventral visual regions. However, diversity factors (e.g., sex, culture, education, socioeconomic background) are rarely considered in these studies. Recognition of individual differences based on demographic, sociocultural, and lifestyle-related factors would permit greater understanding of cognitive aging in health and disease in diverse populations. Here we conducted a systematic review and qualitative meta-analysis of neuroimaging studies of episodic memory, aging, and AD to determine the prevalence of diversity considerations in this literature. Our investigation suggests the current literature does not adequately consider diversity factors. Future studies should prioritize the collection and analysis of data related to participant diversity to help reach a more representative understanding of factors that may influence memory in healthy aging and AD.

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6:00-7:30 PM (3072)

Determinants of the Life Problem Solving. NATALYA N. MEKHTIKHANOVA, Demidov Yaroslavl State University -Traditionally, the study of decision-making processes is carried out using educational or logical tasks. Our aim was to study human solutions to problems arising in everyday life. For this purpose the method of P. Baltes (1993) was used. The subjects solved 8 text problems. The resulting protocols of "thinking out loud" were evaluated on 5 parameters: actual knowledge, procedural knowledge, contextualization, consideration of relativity and uncertainty. The following factors determining the solution of the problem were considered: the presence of professional experience in solving life problems, personal experience of experiencing stressful situations, the level of reflexivity of the individual, the level of wisdom. The sample consisted of 45 people aged 19 to 60, including 15 psychologists. It is established that the more professional experience, the more effectively the subjects solve complex life problems. At the same time, the experience of dealing with stressful situations does not help to solve problems. The level of wisdom is associated with the success of solving complex life problems. This work is supported by Russian Foundation for Basic Research (grant № 19-013-00849) Email: natnik1@list.ru

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6:00-7:30 PM (3073)

The Interplay Between the Significance of a Decision and Emotion in Decision-Making. SERGE CAPAROS, Universite Paris 8, CORENTIN GOSLING, Universite de Nimes, SYLVAIN MOUTIER, Universite Paris Descartes (Presented by Serge Caparos) - The decision-making literature has shown that people's choices are strongly affected by the way in which choices are presented. We examined how this so-called "framing effect" is influenced by the subjective significance of the decision being made. A first study (N = 140) revealed that participants display a robust framing effect when their decision implies a high significance outcome but resist framing manipulation when their decision implies a low significance outcome. A second study (N = 246) showed that the more participants attached importance to a decision target, the more their choices were affected by the framing effect. A moderated mediation analysis revealed that these variations of framing susceptibility were underpinned by the emotion elicited by the choices. The more a decision target was important, the more the gain and loss frames aroused opposite emotions, and this accounted for the increase in framing susceptibility. The results of these studies confirmed that an increase in the significance of a decision is associated with increasing framing susceptibility, and they suggest that this influence on framing susceptibility is underpinned by emotion.

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6:00-7:30 PM (3074)

Emotion Regulation Abilities Predict Differences Between Risk Perception and Risk-Taking Behavior. ALBERTO MEGÍAS-ROBLES, University of Málaga., RAQUEL GÓMEZ-LEAL, University of Málaga, MARÍA JOSÉ GUTIÉRREZ-COBO and ROSARIO CABELLO, University of Granada, PABLO FERNÁNDEZ-BERROCAL, University of Málaga -Although risk perception is a key factor predicting risk-taking behavior, there are situations where the level of perceived risk does not seem to correspond to the decision made. This phenomenon becomes especially evident in contexts where individuals must make decisions under temporal pressure and with strong emotional consequences. The aim of this research was to study if abilities in emotion regulation can explain these discrepancies. One hundred and sixty-nine participants were assessed on emotional intelligence and emotion regulation abilities using the MSCEIT instrument and emotional Go/ NoGo tasks. Levels of perceived risk and risk-taking in different domains were studied by the DOSPERT questionnaire. The results revealed that individuals with a better emotion regulation showed lower differences between the perceived risk and the subsequent decision. This study provides new relevant information to understand risk taking behavior and, in terms of applicability, these findings can help to improve risk prevention programs by the inclusion of emotion intelligence and regulation training.

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6:00-7:30 PM (3075)

Relating Somatic Markers to Reinforcement Learning in the Iowa Gambling Task. WILLIAM M. HAYES and DOUGLAS H. WEDELL, University of South Carolina (Sponsored by Douglas Wedell) - The somatic marker hypothesis (SMH) posits that affective signals guide optimal decision making under uncertainty. It is unclear how somatic markers relate to reinforcement learning (RL) model-derived expectancies. In this study, we recorded the skin conductance responses (SCRs) of 64 participants as they made choices in the Iowa Gambling Task (IGT). SCR magnitude in response to outcomes was positively associated with the unexpectedness of the outcomes, measured as RL model prediction errors, and this relationship increased with task performance. Outcome SCRs were also positively associated with deck-specific arousal ratings obtained after every 10 trials, while valence ratings were related to RL model expected values and expected outcome frequencies, with the latter two relationships varying with task performance. Both outcome- and (absolute) anticipatory-SCR difference measures, as well as RL parameters, significantly correlated with performance. Overall, our results provide new insights into the relationships between somatic markers and reinforcement learning.

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6:00-7:30 PM (3076)

Public Perceptions of US National Parks. SARA PETERS, Newberry College, DANIELLE LEWIS, University of South Carolina - The current work focused on measuring perceptions of the US public toward the National Park System (NPS), and how this translates into care for parks and the environment by citizens. A survey was released in May 2019 to participants via mturk and 212 responded and were divided by age group into younger (Y), middle (M), older adults (O), and seniors (S). Of the participants, 86% of visitors had very positive impressions of the NPS, 9% had positive, and 4.4% reported the experience negative in some way. All negative responses related to overcrowding, or specific mentions of underfunding. Thus, the public appears to hold the parks in high regard and see them as a civic responsibility. In terms of mitigating impact on the environment, 21% of visitors reported using no single-use items while in the park, but the remaining 79% reported using at least 1 single-use item per day. While there is a perception that the public values the NPS, the 2019 government shutdown resulted in trash and damage in some parks. In deciding to recycle at home, Y, M, O, and S had recycling rates of 65, 79, 88, & 100%. So, while parks appear to be a priority to citizens, dissonance exists as to how daily actions also impact the environment the parks exist in.

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6:00-7:30 PM (3077)

Danger! No Hiking! Impact of Social Influence and Warning Signs on Risky Hiking Decisions. COLLEEN F. MOORE, University of Wisconsin-Madison, KATHERINE V. KORTENKAMP, University of Wisconsin-La Crosse, ELLIE MILLER and SOPHIE PITNEY, University of Wisconsin-La Crosse (Presented by Colleen Moore) – Natural resource managers are often dismayed that visitors disobey warning signs, and injuries during outdoor recreation are common. In an online experiment, 244 college students with hiking experience in the last year rated their likelihood to hike in 4 different risky outdoor scenarios with different social situations (alone, with friends who had differing opinions about hiking, with strangers who obeyed or ignored warnings). We also varied information on the signs (safety/warning information, availability of cell service, sanctions for disobeying park rules). Participants also answered self-justification scales of skepticism about danger, ability to avoid dangers, and whether the hike was worth the risk. Results suggest that: a) a very strong influence of social situation (partial eta-squared = .34-.49) indicates that hiker safety can be compromised by social facilitation of rule violation, b) more detailed warning signs may not be effective because visitors may not read and remember the content, c) sanctions for disobeying park rules may not be necessary to deter risky hiking decisions, and d) self-justification beliefs predicted hiking decisions and could be targeted in warning messages to improve safety.

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6:00-7:30 PM (3078)

To Cue or Not to Cue? Seeking and Integrating External Information into Binary-Choice Decisions. GARSTON LIANG, JENNIFER SLOANE, CHRIS DONKIN, and BENJAMIN R. NEWELL, University of New South Wales (Sponsored by Benjamin Newell) - How might a doctor integrate a diagnosis recommendation from a decision aid? How should a student integrate advice from their less-thanreliable friend? In both scenarios, the decision-maker must decide whether or not to seek out external information and if so, incorporate that information into their existing decision process. We use a random dot motion task to examine when might individuals seek out a helpful-but-probabilistic cue. The question of how the external information in the cue affects the decision process is examined using the diffusion model as a measurement model. Preliminary data indicates that external information that is given but not requested affects drift rates rather than start points. These preliminary results suggest that the doctor's decision aid acts as though it affects how subsequent evidence for a diagnosis is accumulated rather than as a bias in favour of the recommended response.

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6:00-7:30 PM (3079)

Allocation of Resources Across Time, Under Uncertainty. ESTHER YOKYUNG WI and KEIJI OTA, *New York University*, TESSA M. DEKKER, *University College London*, LAURENCE T. MALONEY, *New York University* (Sponsored by Laurence Maloney) – Over the course of a day we repeatedly decide how to allocate limited resources – time, energy, money – to improve our position now – and in the future. 16 players participated in a cumulative allocation game where the strategy maximizing instantaneous expected gain led to long-term disaster with high probability. The goal for the player was to "grow" his winnings as rapidly as possible by gambling a proportion of his current winnings on each turn. The game terminated after a random number of trials or when the player lost all points. The optimal strategy that maximized longterm expected gain, led to exponential growth in expected winnings. Participants consistently bet much less than this gain-maximizing strategy would require, with thirteen out of sixteen participants achieving a small fraction of the maximum expected. Envisioning the consequences of exponential growth and the degree of uncertainty involved in long-term investment is challenging for the human system.

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6:00-7:30 PM (3080)

Physical Evidence vs Eyewitness Evidence: When and Why It Is Preferred. THOMAS W. HANCOCK, BLAKE NESMITH, HUYEN TRAN, KEYTON MARZOLF, and KARA MCCRAY, University of Central Oklahoma - purpose of this study was to see, independent of a traditional courtroom setting, if mock jurors have preferences for the types of evidence that they prefer to learn more about. Participants were first provided a description of a homicide that either biased them towards Guilt, Innocence, or Neutral verdicts. They then choose one of six items of evidence in any order (items were equally divided between eyewitnesses and physical evidence). After the first selected item details were read, the process was repeated for the remaining five items of evidence, followed by a final rating of guilt and confidence ratings. The data revealed that those participants in the Guilty primed condition overwhelming started with the physical evidence (86%) and then systematically alternated between eyewitness testimony and physical evidence. The Innocent primed condition showed a different pattern by first preferring eyewitness testimony for their first two choices (67%) and then showed equal preference from that point forward. The neutral group first preferred physical evidence (70%) and then equal preferences for the remaining items. We discuss how the confirmation bias seems to be impacted by the severity of the choice being made.

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6:00-7:30 PM (3081)

Knowing That You Don't Know to Shoot: Examining the Metacognitive Uncertainty Response in Abstract and Applied Contexts. MEGAN CAPODANNO, JORGE SALAMANCA, HEATHER KLEIDER-OFFUTT, and DAVID WASHBURN, Georgia State University (Sponsored by Heather Kleider-Offutt) - Metacognition is central to humans' learning, judgment, and decision-making. It is a fundamental aspect of humans' adaptive intellectual functioning. The proposed research arises from the certainty that metacognition is a crucial faculty regarding functions within the justice system, including those performed by police officers. Public servants in these roles must make decisions and choose responses facing difficulty and uncertainty. Further research has shown that working memory capacity (e.g. how we access and prioritize complex information) has been associated with varying accuracy in police officer decision-making. Recognizing uncertainty in decision-making in these applied contexts can be a life or death scenario. Present measures of metacognitive uncertainty often employ abstract stimuli, but it is unknown Email: Megan Capodanno, mcapodanno1@student.gsu.edu

6:00-7:30 PM (3082)

Investigating the Impact of Explanation and Justification on Trust in Medical AI Diagnostic Systems. LAMIA ALAM and SHANE T. MUELLER, Michigan Technological University (Sponsored by Shane Mueller) - Medical diagnosis tends to follow most-likely-first strategy, where less likely causes are explored only once more likely causes are eliminated. When a patient does not understand this, the resulting errors may reduce trust and acceptance, even if the diagnostic policy were optimal. We hypothesize that explanations (either local justification or global explanation of the process) will induce greater satisfaction, trust, understanding, and perceptions of accuracy. To investigate this, we tested a diagnosis scenario in which a simulated AI system (Medibot.ai) gave a most-likely but incorrect diagnosis, but later it changed the diagnosis to the correct disease. In comparison to a no-explanation condition, justifications that visualized disease likelihoods improved overall acceptance and trust, both before and after re-diagnosis. In contrast, pre-test global explanations using example diagnoses did not show the same benefits. Results suggest that explanations can be effective at improving patient understanding of diagnoses, but not all explanations are equal. Email: Lamia Alam, lalam@mtu.edu

6:00-7:30 PM (3083)

Inhibiting Ventromedial Prefrontal Cortex Using tDCS Increases Utilitarian Moral Judgments. NING HE, HANGZHOU LI, RUICHEN ZHANG, and HONG LI, Shaanxi Normal University - Moral judgment is a complex cognitive process that integrates emotions and moral values into decisionmaking. Lesion studies and some recent empirical research suggests that the ventromedial prefrontal cortex (vmPFC) plays a vital role in moral judgments. But there is no direct evidence of the involvement of this region in resolving moral dilemmas. In this study, we investigated the causal relationship between vmPFC and moral judgments using transcranial direct current stimulation (tDCS) over the vmPFC of healthy participants. Compared to a control group, participants in the treatment group showed more preference for utilitarian moral judgments in personal and impersonal moral dilemmas. Changing the excitability of the vmPFC affects moral judgments in high conflict personal and impersonal moral dilemmas, while there is no significant effect in non-moral and low-conflict moral scenarios. This underscores the relevance of the vmPFC for understanding moral judgments in moral dilemmas. Email: Ning He, hening@snnu.edu.cn

6:00-7:30 PM (3084)

Analogical Transfer in Multi Attribute Decision Making. JUN FANG and LAEL SCHOOLER, Syracuse University (Sponsored by Lael Schooler) - We are sometimes faced with inference tasks in a domain of interest where we do not have sufficient information, but we could use our knowledge from other domains to help solve the problem. We frequently undergo this knowledge transfer process, but what are the underlying mechanisms that enable us to achieve this feat? One possible answer is through analogy. This study is interested in how analogy influences decision making performance in a new environment. The knowledge transferred to a new environment can be the importance of cues, the information search behavior, and the decision-making strategies. The experiments in the study investigate analogical transfer from one domain to another in multi-attribute decision-making tasks. It investigates whether knowledge, such as cue-criterion correlations and bestperforming strategy, can be transferred via analogical mapping. This study uses machine learning techniques to uncover what strategies people have used in the old and new environments. Email: Jun Fang, jfang100@syr.edu

6:00-7:30 PM (3085)

Conversational Pragmatics: The Effect of Formal and Informal Contexts in Sharing Information. BEATRIZ MARTIN LUENGO and MARIA ALEXEEVA, NRU Higher School of Economics, OKSANA ZINCHENKO and YURY SHTYROV, NRU Higher School of Economics - Under uncertainty, people provide less answers in formal (job interview) than in informal contexts (talking with friends). However, in formal contexts like testifying in a trial, reporting information is a requirement, and in informal contexts, like dating someone, we may decide not to give information we are uncertain about. We investigated the effect of different formal (trial, job interview) and informal contexts (talking with friends, date) in the participants' willingness to share information. Participants completed a multiple-choice test about general knowledge. After each selection, one of the social contexts was presented and participants indicated whether they would report their selected answer. We replicated previous results with more reported answers in the informal-friends than for the formaljob interview context. Also, we found an interaction of the four contexts. In the formal context, more answers were reported in the trial than in the job interview, and no differences in reporting were found within the informal contexts. These results highlight the differences in sharing information between different contexts and also, specific sub-contexts, illustrating the complexity of the variables affecting memory reporting. Email: Beatriz Martin Luengo, beatriz.martin.luengo@gmail. com

6:00-7:30 PM (3086)

Cognitive Functioning, Social Perception and Decision-Making Patterns (Evidence from Patients with Parkinson's Disease). JONATHAN A. CABALLERO and MARC D. PELL, *McGill University* – Social decision-making in everyday life involves attending to subtle social cues and using them to guide decisions in ambiguous situations; a process that depends on an intact cognitive functioning. In the present study, we investigated the relationship between the perception of subtle social meanings conveyed through vocal-linguistic cues (the tone of voice + lexical cues), underlying cognitive functions (i.e. working memory, theory of mind), and behavioral patterns in social interaction situations. To address the involvement of various cognitive processes in guiding decision-making, we compared the performance of patients with Parkinson's Disease (PD) - a population with alterations in cognitive and perceptual tasks implicated in social decision-making - with that of healthy participants. Specifically, we addressed social decision-making using a wellestablished social interaction task (Trust Game) and obtained a detailed profile of cognitive functioning using a battery of cognitive evaluations including performance in nonsocial decision-making tasks. We compare the profiles of perceptual and behavioral patterns of healthy individuals and PD patients and explore how different areas of cognitive functioning relate to them.

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6:00-7:30 PM (3087)

Do People Learn Probabilities in Uncertain Environments? ABA SZOLLOSI, CHRIS DONKIN, and BENJAMIN R. NEWELL, University of New South Wales (Sponsored by Christopher Donkin) - People often make choices in environments where successive outcomes are generated by unknown processes. Current models of learning and choice suggest that in such uncertain environments, people learn and base their decisions (in part) on static outcome probabilities - the frequency with which the possible outcomes occur. This view, however, has been called into question on the basis that people's decisions seem to be based on their beliefs about exploitable sequential structures in the environment. In two experiments, we investigated how sequential features of the environment affect people's learning and decision making: We manipulated the sequential structure of an experiencebased decision task and probed participants' knowledge of that structure. Participants in both experiments learned the sequential structure of the task although not perfectly. We develop and discuss a model for people's behavior in sequential decision tasks in which choices are based on a sequence - rather than a frequency - learning process.

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6:00-7:30 PM (3088)

How Strong Is a False Belief? Investigating Illusory Causation and the Outcome Density Bias with Variable and Continuous Outcomes. JULIE YEW LI CHOW and EVAN J. LIVESEY, *The University of Sydney* (Sponsored by Evan Livesey) – Illusory causation is a consistent bias where people overestimate the relationship between a putative cause (e.g., a treatment) and an outcome (e.g., recovery from illness), when there is no real contingency between the two events. Known factors that inflate the illusion of causality include the base rate at which the desirable outcome occurs, for instance, a high probability of recovery produces stronger beliefs about the efficacy of the treatment. This is known as the outcome density (OD) bias. Contingency learning paradigms investigating OD effects have relied on simplified binary outcomes (patient recovers / does not recover). We conducted a series of experiments investigating the effects of outcome density in a fictitious medical scenario, where target outcomes were sampled from distributions comprising variable and ambiguous events that were difficult for the learner to interpret as confirming or disconfirming their causal hypothesis. We found the OD bias to be robust even when outcome events were "noisy" and difficult to dichotomize, much like health information experienced in real life. Email: Julie Yew Li Chow, julie.chow@sydney.edu.au

6:00-7:30 PM (3089)

Holistic and Analytic Representation of Multi-Feature Options in Consumer Decisions. BRIAN M. FRIEL, CHRISTOPHER GITCHO, JAZMYN ROBINSON STOCKTON, and TIANA PRATCHER, Delaware State University - Prior research on multi-attribute options suggests that conscious deliberation leads to worse decisions than those made after a distraction period (e.g., Dijksterhuis et al., 2006). In typical experiments examining this "unconscious" benefit, a lengthy list of randomly ordered statements about the options' attributes is presented, and participants indicate their preferred option after conscious deliberation or distraction. The present study (n = 145) explored whether decisions among cars would improve if conscious deliberation emphasized overall impressions (holistic representation) rather than specific attributes (analytic representation), and if the statements about the options were color coded by option during presentation. The best car option was preferred most often, but the presentation and deliberation manipulations had no significant impact on this proportion. Memory for the options' specific attributes was more accurate, however, for participants in the analytic deliberation group, and better memory performance was associated with greater likelihood of selecting the best option. Email: Brian M. Friel, bfriel@desu.edu

6:00-7:30 PM (3090)

The Impact of Choice and its Outcome on Memory. EUN-JOO JEONG, MIN-SUK KANG, KIEUN LEEM, and YUSIN PARK, Sungkyunkwan University (Presented by Eun-Joo Jeong) - We investigated the impact of the chosen outcome on memory by combining an incidental memory paradigm with a gambling-based choice task. In the choice task, participants decided whether to accept or reject a gamble. The outcome of their choice was presented as a unique image in one of the two categories representing potential gain or loss. For example, when participants accepting the gamble, one category represented a good outcome (gain) and the other represented a bad outcome (loss). However, rejecting the gamble reverse this superficial gain and loss. The influence of the decision-outcome on memory was evaluated in a surprise recognition task. We found that when participants rejected the gamble, participants better recognized the image category associated with gain than the other category. However, when they accepted the gamble, we did not find meaningful differences between the image categories. These results demonstrated that our choice and its outcome influence memory.

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6:00-7:30 PM (3091)

Human Performance in a Bayesian Decision Task Fails Sufficiency. KEIJI OTA and LAURENCE T. MALONEY, New York University - A key step in the Bayesian computation is to summarize sampled data as in a likelihood function. A Gaussian sample, for example, is summarized as its jointly sufficient statistics (JSS), the sample mean and variance. When a distribution has JSS, JSS capture all the information about the true distribution that is in the sample; an ideal Bayesian observer should base all decisions on just the JSS and ignore clusters, gaps, or outliers in the sample. We tested whether human observer conforms to sufficiency in a visual cognitive task. On each trial, participants saw a horizontal penalty line and a bivariate Gaussian sample with n = 30 or 5 dots on a display. Both samples were drawn from the exact same distribution. The participants moved the sample up and down and pressed a button to take one additional sample from the distribution. The participants received a higher reward as the new sample was closer to the line. If it was above the line, they incurred a penalty. We found that the participants violated sufficiency by assigning too much weight to the closest point to the penalty line in addition to the JSS. The participants set the sample of 5 dots closer to the line and incurred a large number of penalty trials than that of 30 dots.

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6:00-7:30 PM (3092)

Towards a Space of Contextual Effects on Choice Behavior: Insights from the Drift Diffusion Model. WENJIA JOYCE ZHAO, AOIFE COADY, and SUDEEP BHATIA, University of Pennsylvania (Sponsored by Jennifer Trueblood) - Choice behavior can be influenced by many different types of incidental contextual effects, including those pertaining to presentation format, emotion, social belief, and cognitive capacity. Many of these contextual effects form the basis of "nudges", used by academics and practitioners to shape choice. In this paper we use data from a very large-scale choice experiment to uncover a space of contextual effects. We construct this space by analyzing fifteen contextual effects using the parameters of the drift diffusion model (DDM). DDM is a quantitative theory of decision making whose parameters offer a theoretically compelling characterization of the cognitive underpinnings of choice behavior. By representing a large number of contextual effects in terms of how they influence the parameters of the DDM, our space is able to precisely measure, quantify, and compare the contextual effects, and interpret these effects in terms of their behavioral, mechanistic, and statistical implications.

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6:00-7:30 PM (3093)

Activation of the Visual Cortex by a Salient Sound Modulates Temporal Order Judgements. AMOUR SIMAL and PIERRE JOLICOEUR, Université de Montréal (Sponsored by Pierre Jolicoeur) - Previous ERP research showed that a salient lateral sound presented with speakers activates the contralateral visual cortex, reflected by the auditory-evoked contralateral occipital positivity (ACOP), whose amplitude correlated with an enhancement in perceptual processing on the cued side. We aimed to replicate the ACOP using earphones, in preparation for future studies using MEG or fMRI, and to discover if this auditory cuing can influence temporal order judgements (TOJ). On each trial we presented a pink noise stimulus synthesized to appear to originate 20° to the left or right of straight-ahead, via earphones. After a delay of 150 ms or 630 ms we presented a grey disk 15° left or right of a fixation cross followed by a disk on the other side with an SOA of 0, 30, or 60 ms. The task was to report the perceived presentation order. We observed an ACOP at posterior electrode sites and confirmed our hypothesis that the lateral sound influenced TOJ by accelerating the perception of the disk presented on the cued side, even though the sound was irrelevant to the task. Preliminary evidence suggested that a greater acceleration of the perception of the disk presented on the cued side was associated with a larger ACOP. Email: Amour Simal, amour.simal@umontreal.ca

6:00-7:30 PM (3094)

Does Attention Modulate Multisensory Integration in a Colavita Task? GENEVIEVE DESMARAIS and LAURA SCHNEEBERGER, Mount Allison University - Whether attention I necessary for multisensory integration is unclear. Studies reporting an effect of attention often use more highlydemanding primary tasks and secondary tasks than studies that do not. We therefore examined the effect of attention on audiovisual integration using a Colavita task where participants typically fail to detect the auditory component of an audiovisual stimulus and varied the demands of a secondary task. Participants reported the modality (auditory, visual, or audiovisual) of either abstract or concrete stimuli, and completed these tasks under full attention or while concurrently completing a foot tapping pattern that was simple (Experiment 1) or complex (Experiment 2). Though participants consistently produced more errors during bimodal trials than either auditory or visual unimodal trials, neither experiment produced a Colavita effect. In Experiment 1, there was no effect of attention. In Experiment 2, attentional load impacted reaction time and interacted with stimulus modality: when attention was divided, the advantage for unimodal stimuli disappeared. These findings suggest that attention may influence underlying processes associated with audiovisual integration.

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6:00-7:30 PM (3095)

Feeling (And Seeing) the Beat: Vibrotactile, Visual, and Bimodal Rate Perception. MERCEDES B. VILLALONGA (J. Frank Yates Student Travel Award Recipient), RACHEL F. SUSSMAN, and ROBERT SEKULER, *Brandeis University* (Sponsored by Robert Sekuler) – Temporal information is

a fundamental aspect of all sensory stimulation but has been largely ignored with respect to vibrotactile perception. In this study, we investigated rate perception and decision-making using sequences of short visual (V), vibrotactile (vT), and bimodal (V-vT) pulses. In Experiment 1, V, vT, and V-vT pulse sequences were presented at mean rates of either 3 or 6 Hz. Experiment 2 used V and vT stimuli only, presented at mean rates of 4 or 6 Hz. On most trials in both experiments, pulse rates were stochastic: intervals between pulses were perturbed by samples from zero-mean Gaussian distributions with different variances. As temporal randomness increased, accuracy fell and response times lengthened. Logistic regression showed that judgments were disproportionately influenced by the first one or two intervals in a sequence. Reduced response time on bimodal trials suggested faster accumulation of evidence, a result confirmed by drift diffusion analysis. Overall, our results show that temporal information conveyed by vibrotactile cues is as robust as that conveyed visually, and that synchronizing vibrotactile cues with cues from other modalities may particularly benefit speeded decision-making. Email: Mercedes B. Villalonga, mbv0@brandeis.edu

6:00-7:30 PM (3096)

Dynamic Non-Speech Stimuli Modulate the Ventriloquist Effect in Situations with Multiple Events. KEIJI KONISHI and KAZUHIKO YOKOSAWA, University of Tokyo (Sponsored by Kazuhiko Yokosawa) - Audio-visual syllable congruency plays a critical role in the spatial ventriloquism, especially in situations with multiple stimuli (Kanaya & Yokosawa, 2011). We conducted two experiments to investigate whether the audio-visual semantic congruency and dynamic information in visual stimuli influenced the binding of non-speech stimuli (naturalistic scenes in Experiment 1 and musical performances in Experiment 2). A dynamic image and a static image were arranged side by side, and a complex sound was presented from either of the two sides of them, such that each image was either semantically congruent or incongruent with the sound. Participants responded by indicating the side where the sound originated. Results showed that a congruent visual image was strongly attracted sound localization, as far as the congruent image was dynamic. This finding suggests that the effect of cognitive factors on audio-visual integration is universal, even though previous studies have reported the specificity of speech stimuli (Vatakis & Spence, 2008). In complex situations, people might first consider the congruency of the dynamic image as irrelevant to audio-visual integration while ignoring the congruency of the static image.

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6:00-7:30 PM (3097)

Influence of Physical Self-Motion Cues on Route Learning While Driving. YASAMAN JABBARI, MICHELLE SHARMA, MARTIN VON MOHRENSCHILDT, and JUDITH M. SHEDDEN, *McMaster University* – Environmental landmarks influence drivers to navigate to a designated destination along an efficient route. Landmarks can be classified as proximal or distal, providing local and spatial mapping cues, respectively. Self-motion cues provide additional information to enhance route memory and navigation, for example, information from optic flow, and from vestibular, proprioceptive, and interoceptive senses. This work examines the contribution of physical motion cues to route memory. A motion simulator was used to study effects of physical self-motion (vestibular, proprioceptive, and interoceptive) within three landmark settings: proximal, distal, and no landmarks. Results showed (1) changes in use of gas/brake pedals in the presence of physical self-motion, (2) improved route learning in presence of landmarks, and (3) further improvement when physical self-motion was correlated with proximal landmarks. This work is aimed at improving understanding of the contribution of multisensory cues to navigation and driving in normal and special populations. Email: Yasaman Jabbari, jabbariy@mcmaster.ca

6:00-7:30 PM (3098)

Face-Voice Space: Integrating Visual and Auditory Cues in Judgments of Person Distinctiveness. JOSHUA R. TATZ and ZEHRA F. PEYNIRCIOGLU, American University (Sponsored by Zehra Peynircioglu) - Multiple dimensions are used to represent faces or voices in perceptual space (e.g., Valentine, 1991; Baumann & Belin, 2010). We examined how a combined face-voice space might differ from its constituent spaces. Participants rated videos of speakers for their dissimilarity in face only, voice only, and face-voice together conditions. Multiple dimensional scaling and regression showed that whereas face-voice space more closely resembled face space, indicating visual dominance, face-voice distinctiveness was best predicted by a super-additive combination of facial and vocal distinctiveness, indicating that auditory and visual cues may be used interactively to differentiate people. Further, the importance given to the various cues in the face and voice spaces (e.g., mouth movement, speaking rate) changed when they were considered in the combined face-voice space. We suggest that such findings may be relevant to understanding person recognition in everyday life and also have implications in such domains as combating in-group recognition biases. Email: Joshua R. Tatz, joshua.tatz@gmail.com

6:00-7:30 PM (3099)

A Body You Couldn't Have: Eliciting Embodiment for Impossible Postures Using the Mirror Box Illusion. WILLIAM LEACH and JARED MEDINA, University of Delaware (Sponsored by Jared Medina) - Body ownership models, informed by the rubber hand illusion, have proposed that biomechanical possibility is necessary for embodiment. We used the mirror box illusion to examine whether this is true. In four studies, participants viewed a biomechanically impossible hand reflection in a mirror directly facing them and received unseen tactile stimulation on their hand. They were then asked whether they felt their hand/touch in the mirror location. First, the biomechanically impossible hand was embodied on approximately half of trials, providing evidence that embodiment can occur even when anatomical constraints are violated. The realistic nature of the mirror hand may outweigh biomechanical impossibility, resulting in the illusion. Second, when embodying the mirror hand, participants felt touch in the mirror location on approximately one-third of

trials. These results demonstrate that ownership and referred tactile sensations are separable phenomenon and suggest that more evidence is necessary to shift perceived touch versus body ownership.

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6:00-7:30 PM (3100)

An Analysis of the Processing of Intra- and Intermodal Time Intervals. SIMON GRONDIN and LEILA AZARI, Université Laval, GIOVANNA MIONI, Università di Padova, ROBERT ROUSSEAU, Université Laval (Presented by Simon Grondin) - In three experiments, the Weber fractions in the 300- and 900-ms duration ranges are obtained with nine types of empty intervals resulting from the combinations of three types of signals: Auditory, Visual, Tactile. There were three types of intramodal intervals (AA, TT, VV) and six types of intermodal intervals (AT, AV, VA, VT, TA, TV). The second marker is always the same during Experiments 1 (A), 2 (V) and 3 (T). With an uncertainty strategy where the first marker is one of two sensory signals being presented randomly from trial to trial, the study provides direct comparisons of the perceived length of the different marker-type intervals. The results reveal that the Weber fraction is nearly constant in the three types of intramodal intervals but is clearly lower at 900 ms than at 300 ms in intermodal conditions. There were no significant differences between the TA and VA intervals (Experiment 1) and between the AV and TV intervals (Experiment 2), but in Experiment 3, the AT intervals were perceived as longer that the VT intervals. The results are interpreted in terms of the generalized form of Weber's law, using the properties of the signals for explaining the additional nontemporal noise observed in the intermodal conditions.

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6:00-7:30 PM (3101)

Vicarious Touch Influences Tactile Processing. ALEXANDRIA G. O'NEAL and JARED MEDINA, University of Delaware - Mirror-touch synesthetes experience tactile sensations on their body while observing touch on another's body. One model proposes that the systems for vicarious touch present in everyone are overactive for mirror-touch synesthetes, resulting in actual sensation when viewing touch. If so, then vicarious touch should implicitly influence tactile processing in non-synesthetes. To examine this, participants were asked to make speeded localization judgments to vibrotactile stimuli on the index or ring finger while watching videos of either a hand or a wooden block being touched. We found a crossmodal congruency effect (CCE); responses were faster when the viewed touch was on the same side as the vibrotactile stimulus. Importantly, the CCE was significantly greater with hand versus wood videos, providing evidence that vicarious touch influences tactile processing in non-synesthetes. Furthermore, mirror-touch synesthetes demonstrated a larger CCE for hand stimuli versus controls, suggesting that this task can be used to identify mirror-touch synesthetes.

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6:00-7:30 PM (3102)

Visuo-Tactile Perception of Material Categories and Properties. MIKOTO ONO, NOBUYUKI HIROSE, and SHUJI MORI, Kyushu University (Sponsored by Shuji Mori) -When seeing and touching objects, we recognize their material categories and properties. Vision and touch contribute to the perception of texture in an independent but complementary manner (Whitaker, Simões-Franklin, & Newell, 2008). The material category and property information may be combined across vision and touch. In this study, we asked 20 participants (16 males, ages 18-24) to rate stimuli in 13 material categories with 12 material properties under vision-only, tactile-only and visuo-tactile conditions. Visual stimuli comprised six different object images and tactile stimuli comprised six different materials. Visuo-tactile stimuli comprised 36 combinations of visual and tactile stimuli. The results indicated interactions between vision and touch in category and property perception. For example, a stimulus categorized as "stone" or "vinyl" of bumpy surface in the vision-only condition was perceived as flat stone when plastic was touched in the visuo-tactile condition. Email: Mikoto Ono, onom@cog.inf.kyushu-u.ac.jp

6:00-7:30 PM (3103)

Viewing Anatomical or Non-Anatomical Stimuli Differentially Affects Visuotactile Integration of Temporal Stimuli on the Body. ALAN MICHAEL O' DOWD, FRANCESCA SORGINI, REBECCA J. HIRST, and FIONA N. NEWELL, Trinity College Dublin - There is evidence from the crossmodal congruency task (CCT) that perceiving bodies augments visuotactile integration. The CCT involves spatial tactile discrimination whilst viewing spatially compatible/ incompatible visual distractors superimposed on anatomical (hands) versus non-anatomical stimuli and yields a unique index of multisensory integration, the crossmodal congruency effect (CCE). However, the CCE may actually represent spatial response conflict. To address this, we aimed to investigate visuotactile integration in young adults (Experiment 1) and children aged 4 -11 years (Experiment 2) using temporally defined tactile and visual events. In young adults, equivalent CCEs occurred in response to hands and object stimuli. However, enhanced tactile discrimination and lower rates of multisensory fusion, but not fission, manifested when viewing hands. The results suggest that previous CCT findings reflect spatial response conflict but that viewing bodies can influence tactile perception and specific patterns of multisensory integration. These findings shed light on the systematic influence of task context and stimulus corporeality on visuotactile perception. Email: Alan Michael O' Dowd, odowda1@tcd.ie

6:00-7:30 PM (3104)

Visual-Vestibular Contributions to Self-Acceleration Vary Detection Across Initial Velocity and Acceleration. DARREN SHANNON М. KENNEY, O'MALLEY, HANNAH M. SONG, MARTIN VON MOHRENSCHILDT, and JUDITH M. SHEDDEN, McMaster University (Sponsored by Judith Shedden) -Visual sensitivity to acceleration is a function of the percentage difference between initial and final velocity (Weber's law). When the percentage difference is greater, relative visual contributions to self-acceleration detection should therefore increase. This study was designed to assess the relative contributions from visual and physical (vestibular and proprioceptive) cues to self-acceleration detection across different velocities. Response times were measured at 3 SOAs: -100ms (physical first), 0ms (in sync), and 100ms (visual first), with 3 initial and 3 final velocities. With time held constant, acceleration was equivalent to the velocity difference. Responses were faster for visualthan physical-first when initial velocities were slower and acceleration was greater, following a percentage difference function. In contrast, physical-first responses were consistent across velocity differences. In-sync responses were fastest across all velocities, demonstrating that contributions from visual and physical self-motion processes produce the fastest and most consistent self-acceleration detection when cues are temporally synchronized.

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6:00-7:30 PM (3105)

Perceptual Learning of Feature Correspondence Within the Visual Modality and Between Audio-Visual Modalities. KAZUHIKO YOKOSAWA and ASUMI HAYASHI, University of Tokyo - We investigated perceptual learning of feature correspondence within the visual modality and between audiovisual modalities. The experiment comprised a learning phase and a test phase. We serially presented moving circles based on specific rules during the learning phase. The moving sequence was also presented in the test phase, and it implicitly indicated the position of presenting the test stimulus. The correspondence among colors, sounds, and spatial positions had been learned before the test phase, such that associations between colorposition and audio-position made additive contributions to learning. The reaction time was faster for color-position associations when the moving rule could be used, whereas the reaction time was delayed for audio-position associations. These results indicate that the learning color associations and moving rules are compatible, whereas learning sound associations and moving rules compete with each other, possibly because colors and movements are regarded as features of the same object in perceptual learning, whereas sounds are recognized as events that are separate from an object.

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6:00-7:30 PM (3106)

Processing the Unexpected: Using Downstream Eye Movements to Investigate Prediction Error Costs in Reading. ROSLYN WONG, AARON VELDRE, and SALLY ANDREWS, *The University of Sydney* (Sponsored by Sally Andrews) – Eye tracking and electrophysiological methodologies provide robust evidence of a processing benefit for words that are predictable from previous context. This benefit appears to support 'strong' models of prediction which assume that expected continuations are pre-activated before they are encountered in text. However, research to date has provided little evidence of the processing costs predicted by such models when readers' expectancies are violated. The current eye tracking study investigated these issues by presenting high and low constraint sentences that contained either an expected word or unexpected alternative; followed by a second sentence that always contained the previously expected word. Eye movements to this downstream target word were used to probe the circumstances under which prediction error costs occur, and their time course relative to the initial anticipatory prediction. The implications of the results for understanding the cognitive mechanisms underlying prediction effects and for models of language comprehension will be discussed.

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6:00-7:30 PM (3107)

Conceptual Metaphors Influence Memory Automatically: Evidence from a Divided Attention False Memory Task. J. NICK REID and ALBERT N. KATZ, Western University -Conceptual metaphor theory posits that broad cross-domain mappings structure our understanding of abstract concepts. For instance, the abstract domain of TIME is partially structured via mapped correspondences from the concrete domain of MONEY, evidenced in expressions such as "lend me a minute," and "how'd you spend the weekend." In previous research, we found that after reading a list of expressions based on the same cross-domain mapping (e.g., TIME IS MONEY), participants falsely recognized non-presented expressions based on the same mapping (e.g., "that cost me a day") more often than control lures (e.g., "the day flew by"). However, the automaticity of the false memory effect remained in question. In the current study, we divided attention at study to directly assess whether conceptual metaphors are encoded automatically or require conscious processing. Even under divided attention, the same false memory effect occurred, suggesting that conceptual metaphors influence memory automatically without requiring conscious attention.

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6:00-7:30 PM (3108)

Do Language Effects on Attention Persist in Complex Task Contexts? JESSICA JOSEPH and BARBARA MALT, Lehigh University (Sponsored by Barbara Malt) - One version of the Whorfian hypothesis suggests that language affects cognition by directing attention towards certain aspects of the environment. However, previous research supporting this hypothesis has not placed language in the context of a broader attention framework. Language effects on attention found in a typical lab setting may not be impactful when other factors (goals, salience, etc.) are impacting attention, as they do in everyday life. The goal of the current studies was to determine whether "thinking for speaking" effects emerge in more realistic conditions. We achieve this by inducing an agent inclusive (active) versus agent exclusive (passive) sentence structure difference in Englishspeakers, utilizing complex scenes as stimuli, and contrasting a typical "describe" task with a task requiring more holistic scene processing: predicting what will happen next. Thinking for speaking effects emerged only slightly and inconsistently across stimuli and two studies. Findings may relate to stimulus and task variation but may also reflect a lack of robustness of Whorfian effects.

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6:00-7:30 PM (3109)

The Effects of Explicit and Implicit Learning of Chinese Numeral Classifiers on Object Categorization Preferences During Immediate and Delayed Testing. YEE PIN TIO and USHA LAKSHMANAN, Southern Illinois University - The current research contributes to debates on the link between language and cognition by investigating the differential effects of implicit versus explicit learning of Chinese Numeral Classifiers on Native-English speakers' object categorization preferences during immediate and delayed testing. Native-English speakers (N=173), randomly assigned to one of four groups based upon learning condition (Implicit versus Explicit) and time of testing (Immediate versus Delayed), were trained on Chinese Numeral Classifiers and tested on their object categorization preferences via a Forced-Choice Task. The results of a 2 X 2 ANOVA indicated a significant interaction between learning condition and time of testing, F(1,169) = 12.781, p < .01. The implicit learning group tested one week after training, showed a significantly higher proportion of classifierbased categorization compared to the implicit group tested immediately after training. However, the two explicit learning groups did not significantly differ regardless of the time of testing. We discuss the implications for the role of explicit and implicit instruction on language learning, retention, and transferability across cognitive domains. Email: Yee Pin Tio, yeepintio@siu.edu

6:00-7:30 PM (3110)

Does Sound Symbolism Shape the Lexicon? Maluma/Takete Gets Real. DAVID M. SIDHU, University of Calgary, CHRIS F. WESTBURY and GEOFF HOLLIS, University of Alberta, PENNY M. PEXMAN, University of Calgary (Sponsored by Penny Pexman) - Previous work has demonstrated a robust sound symbolic association between nonwords containing certain phonemes (e.g., /m/ and /u/) and round shapes; and nonwords containing other phonemes (e.g., /k/ and /i/) and sharp shapes (i.e., the maluma/takete effect; Köhler, 1929). However, it was unknown whether these associations affect the forms of real words (e.g., whether words for round objects contain more phonemes like /m/ or /u/ than would be expected by chance). We examined this by quantifying the roundness/ sharpness of a set of over 2000 objects using best/worst decisions (see Hollis & Westbury, 2018). We then examined whether the presence of individual letters or phonemes in words for these objects predicted their shape. We found evidence for several predictors that were consistent with the maluma/takete effect. For instance, the phoneme /k/ was predictive of a sharp object while the phoneme /u/ was predictive of a round object. These results are the first to suggest that sound symbolic associations affect the lexicon in a largescale manner.

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6:00-7:30 PM (3111)

Interrelations in Emotion and Speech Physiology Lead to a Sound Symbolic Case. SHIN-PHING YU, MICHAEL K. MCBEATH, and ARTHUR M. GLENBERG, *Arizona State University, Tempe* (Sponsored by Arthur Glenberg) – Two experiments explore how emotion physiology can affect language iconicity. We examined how patterns of facial muscle activity (FMA) may lead to associating affect with specific phonemic utterances. We measured the increase in perception of positive affect for the /i:/ vowel sound (as in "gleam") and negative affect for the /^/ sound (as in "glum") for non-words (NWs). English single-syllable NWs containing /i:/ or /^/ were rated on valence -5, -3, -1, +1, +3, or +5. We found /i:/ NWs were rated significantly above 0, and /^/ NWs significantly below 0, confirming a bidirectional emotional association. We then tested whether verbal articulation of NWs containing these vowel sounds with confirmed emotional valence ratings corresponded with consistent affective FMA. We recorded FMA using EMG while participants read NWs. Regression analysis revealed a relation between valence rating of the NWs and FMA. Our confirmation of a relationship between emotion and speech physiology can explain a type of sound symbolism. FMA associated with particular emotions appears to favor production of specific phonemic sounds. The findings support that human physiology associated with emotions likely affects word meanings in a non-arbitrary manner. Email: Shin-Phing Yu, shinphin@asu.edu

6:00-7:30 PM (3112)

Constraining the Construction of Situation Models with Grammatical Aspect and Temporal Shifts. TODD R. FERRETTI, Wilfrid Laurier University, ANITA EERLAND, Utrecht University, DONNELLE DIMARCO, Wilfrid Laurier University, DANIEL P. FELLER and JOSEPH P. MAGLIANO, Georgia State University - We investigated how grammatical aspect of accomplishments (i.e., verbs with duration and natural endpoints) and temporal shifts affect mental model construction. Participants read two-sentence passages such as The boy was washing/washed the dishes. Fifty/eleven minutes later, the dishes sparkled. We examined 1) the N400 and Late Positivity to measure the availability of reintroduced concepts (i.e., dishes) and integration difficulty of these concepts into the situation model, and 2) slow-cortical potentials to measure the cost of interpreting the shifts. Results show that integration was more difficult following perfective than imperfective events, but only following short shifts. Reintroduced concepts elicited a larger N400 following perfective than imperfective aspect, also only following short time shifts. For long shifts, there was a late positivity that was elicited following perfective, but not imperfective events. This research provides insight into how different sources of linguistic and nonlinguistic information combine to constrain the construction of situation models. Email: Todd R. Ferretti, tferretti@wlu.ca

6:00-7:30 PM (3113)

When Grammatical Words Elicit P600S Instead of N400S: A Cross-Linguistic Examination of Lexicalization and Congruency for Motion Events. SAMANTHA N. EMERSON, Boys Town National Research Hospital, ŞEYDA ÖZÇALIŞKAN, Georgia State University, CHRISTOPHER M. CONWAY, Boys Town National Research Hospital – Languages differ in how they express motion: English expresses manner—how—in verbs and path—where—outside the verb (*run into*) and vice versa for Spanish (*enter running*); however, little research has examined the neural processing of motion lexicalization. We examined event-related potentials in native speakers of English (n=23) or Spanish (n=21) reading English- or Spanish-like sentences where motion information was congruent or incongruent with a preceding animation. We hypothesized that the N400marker of semantic expectancy-would show cross-linguistic variation based on congruency and lexicalization preferences. Previously, we found a P600-marker of syntactic violation-in response to incongruent or dispreferred motion verbs despite being grammatical. Here we focused on other expressions of motion (prepositions/gerunds) and found an N400 for incongruent vs congruent motion words in both languages. However, we also found P600s for incongruent vs congruent path prepositions and for manner gerunds vs path prepositions in English but not in Spanish. Overall these results extend the N400 to motion events and suggest that the P600 is sensitive to the rarity of lexical structures and to violations of highly constrained expectancies.

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6:00-7:30 PM (3114)

Parafoveal-On-Foveal Repetition Effects in Sentence Reading: A Co-Registered Eye-Tracking and Eeg Study. JONATHAN MIRAULT, FANNY BROQUA, and STÉPHANE DUFAU, Aix-Marseille University, PHILIP J. HOLCOMB, San Diego State University, JONATHAN GRAINGER, Aix-Marseille University (Sponsored by Jonathan Grainger) - The present study uses combined EEG and eye movement recordings to investigate parafoveal-on-foveal (PoF) repetition effects: word n + 1 is either the same as word n or a different word. Participants read sentences for comprehension, and when their eves left word *n*, the repeated or unrelated word at position n + 1were swapped for a word that provided a syntactically correct continuation of the sentence. We time-locked the analysis of EEG to fixation of word *n* (fixation-related-potentials - FRPs). We found robust PoF repetition effects on gaze durations on word n. Most important is that we also observed significant effects in FRPs, starting in a time-window spanning 120-250 ms post-fixation of word n. Repetition of the target word n at position n+1 caused a reduced negativity in the FRPs, that was most prominent in frontal electrode sites. This PoF repetition effect became stronger and more wide-spread in the N400 time-window. Given their time-course, we conclude that PoF repetition effects in sentence reading reflect the spatial integration of sublexical orthographic information across words n and n+1, and the subsequent impact of these integration processes on identification of word *n*.

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6:00-7:30 PM (3115)

Investigating the Plural Implicature. NIKOLE D. PATSON, *The Ohio State University at Marion* – Plurals (e.g., cats) can be used in contexts in which they do not strictly refer to more than one object. The *more than one* interpretation of the plural is derived via a scalar implicature (Spector, 2007). Consistent with this theory, during the processing of a plural, both the strengthened meaning (i.e., plural meaning) and the semantic meaning (i.e., singular meaning) are available (Patson, 2016). Two experiments used the change blindness detection paradigm (Sturt et al., 2004) to investigate the plural implicature. Experiment 1 manipulated whether or not a plural or singular was in focus. Experiment 2 manipulated whether or not a plural or singular was in a downward entailing environment. Previous work has shown that scalar implicatures are more likely to be computed in focused and non-downward entailing environments, indicating that participants should be more sensitive when the strengthened meaning is changed to the semantic meaning compared to cases in which the implicature is less likely. Results indicated that neither focus nor entailment influenced participants' sensitivity to changes to the plural (ps<.05). This may be due to the plural implicature being computed differently than other implicature types (Spector, 2007).

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6:00-7:30 PM (3116)

Under the Influence of Connectives: How Connective Presence and Clause Order Affect Retention of Text. KOLE A. NORBERG and SCOTT H. FRAUNDORF, University of Pittsburgh (Sponsored by Scott Fraundorf) - Causal connectives (e.g., because) provide information about the relationship that exists between two propositions. Without connectives readers can still infer relationships, and the act of generating an inference may lead to deeper encoding and subsequent retention. However, whether or not the encoded representation reflects comprehension depends upon the accuracy of the inference. We investigated a potential trade-off whereby less cohesive sentences may promote memory for details but at the expense of generating accurate inferences. Participants read short expository passages in which we varied the inclusion of a connective, the order of the clauses (cause-effect or effectcause), and the location of the connective (beginning or middle of the sentence). After reading all of the passages, participants took a memory test in which they selected a causal inference and detail for each passage. We did not find support to suggest that connective absence facilitated memory for details. However, the presence of a connective and cause-effect ordering did facilitate memory for relationships within the text. The findings suggest easier to process sentences more often lead to the formation accurate representations which are retained longer. Email: Kole A. Norberg, kan106@pitt.edu

6:00-7:30 PM (3117)

On the Relationships Between Spoken Instructions and Task Executions in Japanese Language. YOSHIKO KAWABATA, *National Institute for Japanese Language and Linguistics*, TOSHIHIKO MATSUKA, *Chiba University* (Sponsored by Toshihiko Matsuka) – In the present research, we analyzed relationships between the form of spoken instructions and task executions in Japanese Map Task Dialogue Corpus. In Japanese language, it is theoretical considered that people usually use forms of requests (~sitekudasai) or command (~site) when one asks someone to perform a specific action. However, the results of our analyses showed that although these expressions were used, several other expressions, that did not explicitly request or command, were used. The results also showed that the patterns of task execution were different when different forms of instructions were used. When instructions were in the forms of request or command, participants' task execution patterns follow a traditional theory. On the other hand, when other expressions were used, participants tended to carry out the task without sharing what they performed or completed with others. Email: Yoshiko Kawabata, ykawabat@gmail.com

6:00-7:30 PM (3118)

How Do You Measure a Neighborhood? Exploring How Multiple Measures of Phonological Network Structure Jointly Relate to Lexical Processing. MATTHEW T. CARLSON, Pennsylvania State University, VICTORIA GERTEL, Pennsylvania State University, DOMINICK DIMERCURIO, MICHELE T. DIAZ, and CHALEECE W. SANDBERG, Pennsylvania State University (Presented by Matthew Carlson) - Lexical access exhibits well-known local phonological neighbor effects, and specific measures of the interconnectivity among neighborhoods have also been found. However, a comprehensive view of how processing reflects this global connectivity implies the joint influence of many interrelated measures of neighborhood organization. Therefore, using 20,930 words from the English Lexicon Project, we analyzed the joint effects of nine network-theoretic measures (e.g. degree, centrality), together with three lexical properties (e.g., frequency), on response times. In a partial least squares regression, three components sufficiently captured the systematicity in the data ($R^2_{lexical-decision} = .44$, $R^2_{naming} = .34$). All predictors loaded similarly on the first two, with the third revealing some differentiation among the network measures. Decision tree analysis yielded similar results-frequency was the strongest predictor, and network measures became important after controlling for lexical properties. This more comprehensive approach helps focus theoretical accounts of the phonological organization of the mental lexicon.

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6:00-7:30 PM (3119)

Native Speakers Show Semantically Based Generalization During Processing of Novel Phrases: Evidence from Judgements and Brain Potentials. MANUEL F. PULIDO and PAOLA E. DUSSIAS, Pennsylvania State University (Sponsored by Paola Dussias) - Native speakers innovate and are able to understand non-conventional input produced by others, but it is not clear what mechanisms allow for comprehension of novelty. To investigate whether, and how, semantic relatedness facilitates comprehension of novel Verb-Noun phrases, we recorded ERPs while participants provided a judgement task. Twenty native Spanish speakers completed an acceptability judgement task containing conventionalized phrases (e.g., "dirigir un negocio" 'manage a business'), non-conventional phrases containing the same verbs and semantically related nouns ("dirigir un bazar" 'manage a bazaar') and frequency-matched controls containing the same verbs re-paired with semantically unrelated nouns ("reconocer un bazar" 'recognize a bazaar', "dirigir los días" 'manage the days'). Results showed that semantic relatedness with the nouns of conventional phrases was correlated

with acceptability (r_s =0.51, p<0.0001). ERPs revealed (1) an attenuated N400 for conventional phrases relative to all novel phrases; (2) a negativity 500-700ms in novel-unrelated relative to novel-related phrases.

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6:00-7:30 PM (3120)

The Effect of Semantic Priming on Morphological Segmentation of Compounds. ALEXANDER TAIKH, CHRISTINA L. GAGNÉ, and THOMAS L. SPALDING, University of Alberta - In two experiments, we examine whether automatic morphological segmentation occurs when processing compound words. In Experiment 1, we report a transposition-letter priming effect, where interfering with the morpheme boundary by replacing rather than transposing letters of a compound masked prime slows down the recognition of its first morpheme target. Thus, altering the morphemic boundary slows down recognition of the compound by interfering with morphological decomposition. In Experiment 2, we examined whether facilitating early access to the lexical representation of the compound could facilitate its segmentation. A visible semantic prime related (vs. unrelated) to the compound preceded the compound masked prime and the first morpheme target (flag - highlight - high) in a lexical decision task. Importantly, the first morpheme did not retain the meaning of the compound. The related semantic primes reduced the transposition-letter effect, suggesting that facilitating lexical access to a compound facilitates its morphological segmentation.

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6:00-7:30 PM (3121)

Semantic Dynamics and Sense Uncertainty Effects -Predictive Power and Limitations of the Ssd Model. KSENIJA MISIC and DUŠICA FILIPOVIĆ ĐURĐEVIĆ, University of Belgrade (Sponsored by Gareth Gaskell) - The Semantic Settling Dynamics (SSD) model was proposed to account for the large body of inconsistent findings on processing of lexical ambiguity (Armstrong & Plaut, 2016). However, the evaluation of this model is still at its roots. We focused on polysemes (words with multiple related senses) and tested the prediction that an increase in time spent in processing would be followed by a decrease in polysemy advantage in a lexical decision task (LDT). We described polysemy by using a continuous measure of sense uncertainty (entropy) and focused on the slope of entropy effect in relation to the time spent in processing. In the standard visual LDT (baseline) we replicated the finding that polysemous words with higher entropy (high number of balanced senses) were processed faster (Filipović Đurđević, 2007). An attempt to prolong the processing by reducing the contrast between the stimuli and the background did not affect the time spent in processing, but neither did it affect the slope of the entropy effect. Finally, presenting the same stimuli in auditory LDT prolonged the processing and cancelled out the entropy effect. Our results speak in favor of the SSD model, but also point to certain limitations which we will discuss in detail. Email: Ksenija Misic, ksenija.misic@gmail.com

6:00-7:30 PM (3122)

Getting the Drift of Lexical Proficiency: Investigating Individual Differences in Lexical Decisions. STESON LO, The University of Sydney, MELVIN J. YAP, National University of Singapore, SALLY ANDREWS, The University of Sydney - This project goes beyond the group-level analyses that have dominated empirical research and modeling of visual word recognition by investigating relationships between individual differences in written language proficiency and parameters from Ratcliff's drift diffusion model (DDM). DDM decomposes variability in speed and accuracy of lexical decisions into component processes, including time spent encoding/responding to stimuli (Ter), rate of evidence accumulation for words and nonwords (drift), and the response criterion. Extending Yap, Balota, Sibley and Ratcliff's (2012) evidence that vocabulary is correlated with drift rate, we re-analysed three lexical decision datasets that measured vocabulary, reading comprehension and spelling ability (Andrews & Hersch, 2010; Andrews & Lo, 2012, 2013). These analyses converged in showing that comprehension and spelling differentially predicted speed and accuracy of lexical decisions: drift correlated significantly with spelling ability, while comprehension influenced either Ter or criterion. The implications of the findings for models of word recognition will be discussed.

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6:00-7:30 PM (3123)

Identifying Differences and Consistency in Literal Comprehension of East Asian Writing Systems. JOOHEE AHN, SEONGHAK JO, HASUN SHIN, and SOLBIN LEE, Korea University - It is thought to be necessary to get the basic data of the physical properties of the letters by manipulating visual field and visual angle with words(or phrases) written in Hanguel, Chinese, Japanese Kana and Kanji to extend Psychological researches of East Asian languages. In this research I implemented behavior Lexical decision tasks to Korean, Chinese, and Japanese subjects using their native languages to figure out consistency and differences. The results showed that in every group there were right visual field advantages as many precedent researches had proved. However, as for the visual angles, there was a difference between 0°~2.5° and 1°~3.5° only in the left visual field. Words shown on 0°~2.5° were discriminated faster than on 1°~3.5°. In cross-language comparisons, discriminating time was faster in Korean than in Chinese in both visual fields, but the error rate was high in right visual field in Korean. Japanese word discriminating time was significantly slower than Korean and Chinese discriminating time, still the Japanese error rate was lower than that of Chinese. Like visual field researches in English, the processing of East Asian languages is found to be predominance in right visual fields.

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6:00-7:30 PM (3124)

An Erp Investigation of Orthographic Precision in Deaf and Hearing Readers. GABRIELA MEADE, San Diego State University, JONATHAN GRAINGER, Centre National de la Recherche Scientifique, KATHERINE J. MIDGLEY,

PHILLIP J. HOLCOMB, and KAREN EMMOREY, San Diego State University (Sponsored by Phillip Holcomb) - We used transposed-letter (TL) priming to index how precisely deaf and hearing readers encode orthographic information. Phonology is thought to play a critical role in tuning orthographic representations over time, but it is unknown whether deaf readers' reduced access to spoken phonology reduces orthographic precision. Word targets were preceded by masked primes in four categories: adjacent TL (e.g., balacne-BALANCE), adjacent substitution (e.g., balarse-BALANCE), non-adjacent TL (e.g., bacanle-BALANCE), and non-adjacent substitution (e.g., barande-BALANCE). TL primes formed by reversing two letters in the word facilitate target processing more than substitution primes in which those letters are replaced, especially when the letters are in adjacent positions. We found that pattern in both groups here. Moreover, the ERP effects were shifted in time such that the adjacent TL priming effect arose earlier than the non-adjacent TL priming effect in both groups. These results suggest that phonological tuning is not required to create precise orthographic representations. Email: Gabriela Meade, meade.gabriela@gmail.com

6:00-7:30 PM (3125)

Feedforward and Feedback Consistency Norms for 35,306 English Words. QIAN WEN CHEE, KENG JI CHOW, MELVIN J. YAP, and WINSTON D. GOH, National University of Singapore (Sponsored by Winston Goh) - Consistency reflects the mapping between spelling and sound. That is, a word is feedforward consistent if its pronunciation matches that of similarly spelled words, and feedback consistent if its spelling matches that of similar pronounced words. For a quasi-regular language like English, the study of consistency effects on lexical processing has been limited by readily accessible norms. In order to improve current methodological resources, feedforward and feedback (sound-to-spelling) (spelling-to-sound) consistency measures for 35,306 English words were computed. The consistency measures developed here are operationalized at the composite level for multisyllabic words, as well as at different sub-syllabic segments (onset, nucleus, coda, oncleus, and rime) for both monosyllabic and multisyllabic words. These measures constitute the largest database of English consistency norms to be developed and will be a valuable resource for researchers to explore the effects of consistency on lexical processes such as word recognition and spelling.

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6:00-7:30 PM (3126)

The Role of Emojis in Text-Based Communication: Evidence from Eye Movements. ELIZA BARACH, HEATHER SHERIDAN, and LAURIE BETH FELDMAN, *University at Albany, SUNY* (Sponsored by Heather Sheridan) – Emojis supplement the lack of non-verbal cues in text-based communication, which aids in message disambiguation and expression. In the present study, we used eye tracking to examine the time course of emoji processing during reading. We specifically examined eye movements while participants read sentences containing a target word (e.g., *coffee* in the sentence "My tall coffee is just the right temperature") when there was no emoji present and when there was a semantically congruent (e.g., the coffee emoji) or incongruent emoji (e.g., the beer mug emoji) present at the end of the sentence. Similar to word congruency effects, incongruent emojis were fixated longer and were more likely to be refixated than congruent emojis. In addition, incongruent emoji were less frequently skipped than congruent emoji which suggests that emoji can be processed in the parafovea. We discuss the implications of our results for models of eye movement control during reading. Email: Eliza Barach, ebarach@albany.edu

6:00-7:30 PM (3127)

The Time-Course of Lexical and Semantic Effects in Derived Word Recognition: A Combined EEG and Eye-Tracking Study. GAISHA ORALOVA, ROBER BOSHRA, DANIEL SCHMIDTKE, JOHN CONNOLLY, and VICTOR KUPERMAN, McMaster University (Sponsored by Elisabet Service) - Schmidtke and Kuperman (2018) highlighted a paradox in the estimates of the time-course of word recognition where neural activity for morphological/semantic effects reported in the literature tends to lag behind the timeline of behavioural results, and by using a non-parametric technique of survival analysis established the upper temporal bounds at which these effects are expected to emerge in brain activity. We co-registered EEG and eye-tracking signals when English speakers read a series of derived words (e.g., government) shown in sentences and in isolation. Word frequency and semantic transparency were orthogonally manipulated. Survival analysis showed consistent divergence between high- and low-frequency words at 223ms for words read in sentences, and at 679ms for words showed in isolation. Fixation-related potential (FRP) analyses demonstrated the same effect peaking at 400ms for words in isolation and at 300-400ms in sentence reading. FRP analysis is intended to confirm or deny the apparent paradox mentioned above. Further analysis of semantic transparency and methodological implications will be discussed. Email: Gaisha Oralova, oralovag@mcmaster.ca

6:00-7:30 PM (3128)

Are Better Young Readers Less Likely to See a Ghost in a Ghsot? MANUEL PEREA, Universitat de València, PABLO GOMEZ, DePaui University, ANA MARCET, Universitat de València (Presented by Manuel Perea) - One of the most replicated effects in the contemporary word recognition is that pseudowords created by the transposition of two letters (e.g., GHOST) are often misread as the real word. This effect suggests that readers employ a flexible input scheme when encoding letter positions. The relationship between reading skill and the magnitude of the transposed-letter effect is a contentious issue. The present lexical decision experiment was designed to shed some light on the relationship between reading skill and the size of the transposed-letter effect with a large sample of 6th graders. We conducted multiple regression and path analyses. Results showed that a specific aspect of reading skills (pseudoword reading) negatively correlates with the magnitude of the transposed-letter effect in the error data (e.g., GHSOT is less

wordlike for better readers). This finding highlights the need for a comprehensive model of visual word recognition that includes individual variability.

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6:00-7:30 PM (3129)

Spoken Word Recognition in Young Children. ELIZABETH SCHOEN SIMMONS and JAMES S. MAGNUSON, University of Connecticut (Sponsored by James Magnuson) - In adult spoken word recognition (SWR), competition depends on temporal distribution of similarity. Words with similar onsets (cohorts) compete strongly and early, while rhymes compete later and more weakly. Less is known about the fine-grained timecourse of SWR in young children. Some developmental theories predict that cohorts and rhymes should compete similarly, while others predict that rhyme sensitivity should emerge around age 5, either as a side-effect of learning to read or acquiring sufficient vocabulary. We examined SWR in preschoolers (3-5 years), school-age children (8-10 years), and adults (18-22 years). We used a two-choice visual world paradigm with picture pairs depicting cohorts (bat/bath), rhymes (key/bee) or unrelated (bird/cheese) words. Eye movements revealed similar phonological competition in all three groups. While the preschool group was slower to settle on target images, they still processed spoken words in an incremental, adult-like fashion. We will discuss the implications for developmental theories of SWR.

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6:00-7:30 PM (3130)

How Do Polysemy Effects Interact with Standard Psycholinguistic **Covariates?** DI MO, BAREND BEEKHUIZEN, SUZANNE STEVENSON, and BLAIR ARMSTRONG, University of Toronto - The effects of polysemy vary considerably within and between tasks, ranging from processing advantage in many studies of lexical decision to processing disadvantage in tasks such as semantic categorization. Prior accounts of these effects have focused on the time-course of semantic processing and the configuration of decision systems in different tasks. Here we explored an additional possibility: polysemy interacts with different levels of standard psycholinguistic covariates across experiments to produce different ambiguity effects. We predicted behavioral data from several mega-studies using an estimate of word polysemy that interacted with psycholinguistic covariates relating to sublexical, lexical and semantic properties. We found that although the core advantage and disadvantage effects for different tasks remain, these effects were substantially modulated by several covariates. Our results indicate that study designs and cross-experiment comparisons must factor in the role of these covariates in interpreting different ambiguity effects.

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6:00-7:30 PM (3131)

Explore of the Interaction Between Neighbours and Predictability. PANPAN YAO, Chinese Academy Sciences -In this study, we conducted two eye-tracking experiments to explore how the visually similar words (orthographic neighbours) affect a word's processing in high and low constrained sentences (predictability) in Mandarin Chinese. We tested the effects from the neighbourhood size (words with big or small neighbourhood size, i.e., many or few neighbours) and the neighbourhood frequency (words with or without higher frequency neighbours) respectively. Apart from the substantial predictability effect, we found significant interactions between neighbourhood size and neighbourhood frequency and predictability. Only in low-constrained sentences, big neighbourhood size inhibited a word's early and late stages of processing, and words with higher frequency neighbours evoked more regression out and longer go-past time. The results indicate that both the predictability constrained from previous context and the size & frequency of a word's neighbours affect the lexical processing. This finding shed some light on models of word identification and processing.

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6:00-7:30 PM (3132)

Desirable Difficulty and Lexical Expertise Affect Lexical Acquisition. MICHAEL A. ESKENAZI and BAILEY NIX, Stetson University - Complex or novel fonts result in slower and less efficient reading (Rayner et al., 2006), but also result in improved comprehension (Diemand-Yauman et al., 2011). These atypical fonts may provide a desirable difficulty benefit in that they present a challenge that enhances encoding (Bjork, 1994; McDaniel & Butler, 2011). The purpose of this study was to determine whether desirable difficulty effects enhance the incidental word learning process during reading using a novel font, Sans Forgetica (SF). The SF font removes sections of letters, which makes words more difficult to process. All 120 participants read 15 very low frequency English words (e.g. mephitic) in two meaningful contexts each while their eye movements were monitored and were randomly assigned to the SF or typical font conditions. Participants completed a surprise spelling and vocabulary test and a spelling skill assessment. The SF font resulted in better spelling (82% v 69%) and meaning (47% v 33%) acquisition for high skill spellers. However, low skill spellers demonstrated no desirable difficulty benefit for spelling or meaning. Therefore, desirable difficulty effects may depend on a reader's lexical expertise when learning new words. Email: Michael A. Eskenazi, meskenazi@stetson.edu

6:00-7:30 PM (3133)

The Role of Contextual Processing in Skilled Word Recognition. ASHLEY N. ABRAHAM and JOCELYN R. FOLK, *Kent State University* (Sponsored by Jocelyn Folk) – The current study examines automatic word recognition in skilled, adult readers. Previous research suggests that skilled adult readers activate the meaning of a word through context-independent, bottom-up processing of word spellings (Stanovich, 2000). However, research also has shown that skilled adults recognize words appearing in context faster than those that do not (e.g., Ehrlich & Rayner, 1981). Recent research has suggested that context-dependent word recognition is due to inefficient bottom-up processing (Andrews & Bond, 2009). To investigate contextual processing, the current study explores two factors that impact bottom-up processing efficiency: word frequency and reader skill. Participants read sentences each containing a target noun that was preceded by either a related or unrelated word while their eye movements were monitored. Target word frequency was varied. Measures of spelling and vocabulary skill were used to assess reader skill. Results suggest that reader skill and word frequency have a strong influence on word recognition. However, this relationship is impacted by context, particularly for low frequency words. Specific results regarding context use and skilled word recognition will be discussed.

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6:00-7:30 PM (3134)

Examining the Relationship Between Music Skills and Word-Level Reading Skills. NICOLE ARCO and ELIZABETH A. HIRSHORN, SUNY New Paltz - Word reading in English has the flexibility to be processed at the lexical level (i.e., whole word) or at the sub-lexical level (e.g., focusing on phonological subunits). Recent research suggests that there are individual differences in reading style that rely more on lexical or sublexical processing. The current study examined musical training as a potential correlate of individual differences in reading style. It is well documented musical training is linked with better reading outcomes, but it remains unclear if and how word knowledge is impacted. Measures of musical and reading subskills were collected, in addition to tasks that tap into correlates of reading style (e.g., inversion sensitivity). Results suggest that while there were no differences in word knowledge, musicians had better phonological awareness compared to non-musicians. Evidence suggests that this enhanced skill could be linked to experience with fine-grain timing required in musical training, and that temporal processing is a better predictor of word reading in musicians. Overall, results suggest that musical training may be related to greater reliance on sub-lexical level processing, but that does not necessarily translate to better word reading, per se.

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6:00-7:30 PM (3135)

The Influence of Foveal Lexical Processing Load on Parafoveal Preview Extent in Chinese Reading. MANMAN ZHANG, *Tianjin Normal University*, SIMON PAUL LIVERSEDGE, *University of Central Lancashire*, ZHICHAO ZHANG and XUEJUN BAI, *Tianjin Normal University*, CHUANLI ZANG, *University of Central Lancashire* – Recent research investigating the foveal load effect on parafoveal preview has failed to distinguish between the depth and the spatial extent of parafoveal processing. The present study explored how foveal load (high/low frequency - low/high load) influences preview extent (zero, one, two or three characters of parafoveal target words, or the full sentence) in Chinese reading using the boundary paradigm. Pretarget word analyses showed an effective foveal load manipulation. Reading times on the target showed that the smaller the preview window, the more disruption to processing occurred. Interactive effects were apparent such that reading times were similar across load conditions for full, three- and two-character previews, but shorter under high- than low-load conditions for one-character and zero previews. Foveal load modulated parafoveal preview extent during Chinese reading, limiting it to a single parafoveal character and reflecting a reduction in preview cost rather than an increase in preview benefit.

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6:00-7:30 PM (3136)

What Determines Synesthetic Colors for Graphemes in a Non-Native Orthography? ANNE MARIE CRINNION, Harvard University, ARIEL COHEN-GOLDBERG, Tufts University, TERESA SCHUBERT, Harvard University (Sponsored by Ariel Cohen-Goldberg) - Grapheme-color synesthesia is a phenomenon in which individuals experience a consistent associated color for letters and/or digits. Much of the current research has found that synesthetic colors are primarily associated with graphemes themselves rather than the sounds they represent. Less is known, however, about how colors are associated across a bilingual's two alphabets. Our study examines the percepts of two bilingual individuals with color-grapheme synesthesia whose orthographies do not share graphemes, specifically English and Hebrew (e.g., A, x). We ask what determines the associated colors for synesthetes in this situation, testing shared visual letter shape and shared phonology. We found that the synesthetes' colors for Hebrew graphemes were primarily driven by their phonetic similarity (and not their visual similarity) to English graphemes. Thus, while letter sound does not seem to drive color associations in L1, phonology does seem to be an important organizing principle for L2 grapheme-color associations.

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6:00-7:30 PM (3137)

The Impact of Graphomotor Memory and Visual Detailed Analysis on Glyph Recognition. ALAIN CONTENT and LOLA SEYLL, Université Libre de Bruxelles (Presented by Alain Content) (Sponsored by Alain Content) - Recent data showed that learning glyphs through handwriting leads to better recognition than learning through typewriting, suggesting that the motor programs acquired through handwriting play a role in glyph recognition (Longcamp et al., 2005, 2006; James & Engelhardt, 2012). However, to reproduce all elements of the target, handwriting also requires a detailed visual analysis that is not necessary when typewriting. The present study attempted to disentangle the respective contributions of detailed visual analysis and motor knowledge. We compared handwriting and typewriting to a composition condition requiring a detailed visual analysis without graphomotor component. Adults participants learned glyphs either through handwriting, typewriting or composing. An old/new recognition test was administered immediately after learning and again two weeks later. When target presentation duration was unlimited, composing led to as good recognition performance as handwriting, both better than typewriting. When presentation duration was fixed to 100ms,

handwriting led to higher recognition than composing. Both graphomotor knowledge and detailed visual analysis seem thus to play a role in glyph memorisation and representation. Email: Lola Seyll, lseyll@ulb.ac.be

6:00-7:30 PM (3138)

Adult Age Differences in Word Frequency and Word Predictability Effects in Reading: Evidence from Eye Movements and Fixation-Related Potentials. ASCENSION PAGAN, University of Leicester, FEDERICA DEGNO, University of Central Lancashire, RICHARD KIRKDEN and SARAH J. WHITE, University of Leicester, SIMON P. LIVERSEDGE, University of Central Lancashire, KEVIN B. PATERSON, University of Leicester - Older readers are believed to have greater difficulty identifying words and so produce larger word frequency effects, and compensate for this difficulty by making greater use of context to predict words. While numerous eye movement (EM) studies show larger word frequency effects for older than younger adults, evidence for compensatory use of context is sparse. Moreover, ERP studies show larger predictability effects for younger than older adults when words in sentences are presented sequentially. Given this contradictory pattern, we used co-registration of EMs and fixation-related potentials (FRPs) to examine age differences in effects of word frequency and predictability. Preliminary EM analyses show trends towards larger frequency and predictability effects for older readers; while FRPs will show the neural basis of these effects. We will discuss our findings in relation to the debate concerning aging effects on reading, and prior research showing word predictability, but not word frequency, effects in FRPs. Email: Ascension Pagan, appc1@le.ac.uk

6:00-7:30 PM (3139)

Boosting Novel Word Learning in L1 and L2 Readers of English. MELDA COSKUN, NADIA KRYVOBOK, and VICTOR KUPERMAN, McMaster University (Sponsored by Victor Kuperman) - Learning new words in one's native (L1) and non-native (L2) languages is a continuous and essential process for acquiring language proficiency. This process critically depends on both the individual ability to absorb new information from noisy environment and the linguistic and extra-linguistic contexts in which novel words occur. We report a series of experiments conducted in incidental and intentional word learning paradigms with a goal of establishing parameters of learning that would boost orthographic and semantic knowledge of novel words, as well as their retention over time, in L1 and L2 readers of English. To this end, we systematically examined the properties of the linguistic contexts (their affective value), the properties of novel words (set up in a context to represent an abstract or a concrete concept), the properties of the learning context (the number of exposures to a new word and its density in time), and the properties of readers (their English proficiency and ability for statistical learning). Novel findings indicate a reliable contribution of affective and sensorimotor information about the new word available from the linguistic context, and the importance of individual variability for learning outcomes.

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6:00-7:30 PM (3140)

Exposure Frequency Effects in Learning and Scanning. MENGSI WANG, University of Central Lancashire, HAZEL I. BLYTHE, University of Southampton, SIMON P. LIVERSEDGE, University of Central Lancashire (Sponsored by Simon Liversedge) - In three experiments, we examined how exposure frequency of novel stimuli (Landolt-C clusters in Experiment 1 vs. pseudowords in Experiments 2 & 3) affected the rate of learning, and whether simulated exposure frequency influenced eye movements during scanning of longer strings under different demarcation presentations (spaced vs. unspaced shaded vs. unspaced). Common findings were as follows: Learning rates were modulated by exposure frequency, but exposure frequency did not influence eye movements during scanning. Robust spacing effects occurred. Spacing facilitated target identification and saccadic targeting. Interestingly, the pattern of learning curves and the degree to which shading facilitated scanning varied across the three experiments. We discuss our findings in relation to the complexity of the stimuli and variance across writing systems in relation to our participants' native language (Chinese vs. English). Email: Mengsi Wang, mwang19@uclan.ac.uk

6:00-7:30 PM (3141)

"Actions / Characters: Which Word Have You Looked at Most?" Finding the Most Disturbing Coherence Change for Children and Adults: An Eye-Tracking Study About Reading Comprehension. LORENA ALICIA MARTIN-ARNAL, JOSÉ ANTONIO LEÓN, and RICARDO OLMOS, Universidad Autónoma de Madrid (Sponsored by Juan Botella) - Some experiments aimed to describe in the last decade processes of comprehension through eye-tracking. Very few of them have compared different ways of shifting coherence and if it affects readers. Bailey et al. (2017), for example, found that readers update their situation models when characters and spatial locations change the narrative information. Our aim was to finally compare two different types of coherence --shifts on characters VS on actions- to figure out if they influence eye movements from 32 (aged 18-24) adults and 30 children (10-12 years old) who participated in this experiment. We used an eyetracker Tobii-x120 to record eye movements and a multilevel (crossed random effects) model to analyze data. Results showed that characters received more and longer fixations than actions on coherent endings, while the opposite happened for incoherent endings. Thus, incoherence makes participants to focus more on coherent endings when shifts are about characters, and on incoherent, when they are about actions. As these differences are longer on incoherent endings, stories seem more difficult to understand for shifts on actions.

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6:00-7:30 PM (3142)

The Allograph Priming Effect in Simplified and Traditional Chinese Characters. LILI YU, Macqu, LE FU and YANPING LIU, Sun Yat-sen University, SACHIKO KINOSHITA, Macquarie University – Letter priming by its allographic variant (e.g., "G" and "g") is reliably established in the Roman alphabet. However, there is a debate regarding the origin of this effect: Is the effect due to the upper- and lower-case letters sharing the same letter name ("gee"), or because the two forms map onto the same abstract letter identity? We investigated this question using the traditional-simplified Chinese character pairs (e.g., "頭" and "头", pronounced as "[tou2]", meaning "head") in a same different task, with (a) the identical form (e.g., "头-[tou2]head"), (b) a homophone (e.g., "投-[tou2]-throw"), and (c) a unrelated character ("次-[ci4]-secondary") of the simplified character as the prime. Our results showed a robust abstract character identify effect, and this effect was driven by the abstract orthographic form of the character pairs, rather than their name.

Email: Lili Yu, lili.yu@mq.edu.au

6:00-7:30 PM (3143)

The Inevitability of Ambiguity: The Effect of Syntactic Ambiguity on Eye-Movements During Continuous, Silent Reading. ANGELIKI GLENI, MANOS KTISTAKIS, MIHALIS AGIORGIOTAKIS, PANAGIOTIS G. SIMOS, MILTIADIS K. TSILIMBARIS, and SOTIRIS PLAINIS, University of Crete (Sponsored by Jennifer Wiley) - Various parsing models have been proposed regarding syntactic ambiguity (e.g., Frazier & Rayner, 1982; Spivey & Tanenhaus, 1998; Van Gompel, Pickering, and Traxler, 2001). The present study investigates the online processing of globally vs locally ambiguous sentences in Greek. By recording the eye-movements of 44 subjects as they read ambiguous sentences embedded in short paragraphs, we were able to assess different strategies of syntactic ambiguity processing. Text, sentence, and phrase analysis revealed the effects of subject - object ambiguity on eye-movement parameters such as the mean number of fixations per word, fixation duration and percentage of regressions. Differences in these parameters were found between distinct interest areas, and between the immediate and late processing of the experimental sentences. Interestingly, we found correlation between the effect of ambiguity and readers' level of structural awareness. Combining eye-tracking with standardized questionnaires and additional online techniques could further elucidate this issue in the future.

Email: Angeliki Gleni, agleni.re@gmail.com

6:00-7:30 PM (3144)

Orthographic Learning via Self-Teaching Among English Language Learners. YIXUN LI, DANIEL SHERLOCK and MIN WANG, *University of Maryland, College Park* (Sponsored by Min Wang) – The present study investigated self-teaching in orthographic learning among children who are learning English as a second language (L2). Specifically, we examined the roles of exposure time and context as well as the retention of learning. Seventeen third-grade English L2 children with Spanish L1 read aloud and comprehended eight texts including four cohesive stories and four scrambled texts, each containing one target pseudoword. In half of the texts, the target pseudowords appeared four times and six times in the other half. Orthographic decision and spelling posttests were administered both immediately after text reading and in seven days. Results showed that English L2 children demonstrated orthographic learning with four exposures and maintained it for seven days. More exposures, better learning. Story context helps them build up temporary orthographic representations for recognition, but scrambled texts enhance their recognition for retention. Scrambled texts also promote precise orthographic representations in a demanding spelling task. Email: Yixun Li, yixunli@umd.edu

6:00-7:30 PM (3145)

Warning! the Benefits of Evaluative Searches Are Not Augmented by Pre-Task Admonitions. AMALIA M. DONOVAN, YULAN CHEN, and DAVID N. RAPP, Northwestern University (Sponsored by David Rapp) - Studies have shown that readers often rely on inaccurate information presented in texts to complete post-reading tasks. This reliance has proven difficult to attenuate, with few interventions yielding reliable reductions. For example, warnings do not seem to reduce participants' reproductions of previously read inaccuracies on related questions. But what if participants were also allowed to consult outside sources during task completion? Across two experiments, participants read texts containing inaccurate information and then potentially received a warning about possible false inclusions in those materials. Participants next completed a general knowledge questionnaire containing items relating to previously presented inaccuracies. Participants were given the option to search online while completing the questionnaire, allowing for evaluative processing involving not only prior knowledge but also outside sources. The combined influence of warnings and opportunities to search reduced traditionally obtained patterns of reproductions, with the benefits largely a function of searching rather than warnings. Email: Amalia M. Donovan, amaliadonovan2013@u. northwestern.edu

6:00-7:30 PM (3146)

The Influence of Mood and Generating Personal Connections on Mind-Wandering During Reading. SHELBY L. SMITH and CAITLIN MILLS, University of New Hampshire (Sponsored by Caitlin Mills) - Prior research suggests that positive and negative moods have dissociable effects on comprehension outcomes; however, the influence of mood on thought processes during reading is less understood. The current study therefore explores two types of thought processes in relation to mood during reading: 1) how often participants make personal connections with information from the text and 2) rates of mind-wandering (measured as off-task thought). Participants were induced with either a happy or sad mood, followed by a reading task with intermittently dispersed thought probes. Making a personal connection with the text was positively related to wandering off-task in general, B = .47, p = .01; this finding was stronger for participants in the sad condition, B =1.31, p < .001, in comparison to the happy condition, B = .48, p= .01. These findings highlight the critical influence of mood on how we process information during reading.

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6:00-7:30 PM (3147)

The Impact of Attentional Focus on the Musician Edge for Foreign Language-Learning. HENRIETTA LEMPERT, MURA ABDUL-NABI, and JASMINE HARTLAUB, University of Toronto - We examined whether attentional focus modulates the benefits of music training for learning a foreign language. Undergraduate music experts (n = 70) and non-experts (n = 70)59) heard English datives (Meg gives Pam a book) followed by two Korean translations recorded in two prosodic versions, naturalistic sentence intonation and monotonet, word-byword intonation. Experiment 1 learners were instructed to discover the morphosyntactic rules for the Korean sentences (rule-learning focus), whereas Experiment 2 learners were instructed to learn the Korean translations of the English words (word-learning focus). Following three study-test blocks, all participants were tested for word-learning. Music experts significantly surpassed non-experts on morphosyntactic tests in Experiment 1(Group x Prosody x Block ANOVA, DV = d', p < .001) but did not differ from non-experts in Experiment 2 (p = .39). Word-learning profiles differed significantly with attentional focus, music training, and prosodic condition in a manner suggesting top-down control over transfer of musicrelated abilities to language.

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6:00-7:30 PM (3148)

Directionality Moderates Perception of Major Versus Minor Scales and Melodies. JAKE ZIEDE, EMMA M. LONG, and BRYAN R. BURNHAM, University of Scranton - Major musical keys are more arousing and are perceived happier, positively, brighter, and less awkward than minor musical keys; and this difference in the perceived emotional and aesthetic qualities of musical keys is affected by the direction of notes within a scale. Our experiments began by familiarizing participants with ascending and descending major and minor scales. We then played ascending and descending scales and asked participants to identify whether each scale was major or minor. Our results showed that accuracy in detecting major and minor keys was moderated by directionality; specifically, major scales were better detected when played ascending, whereas minor scales were better detected when played descending. Subsequent experiments extended this interaction between mode and directionality to simple melodies, and we observed the direction of the notes within a melody moderated the accuracy of identifying melodies as major or minor. Each experiment also had participants rate happiness, brightness, and awkwardness of scales, and we replicated the difference in aesthetic perceptions of major and minor scales was affected by directionality. We are now investigating reasons for this crossover interaction. Email: Bryan R. Burnham, bryan.burnham@scranton.edu

6:00-7:30 PM (3149)

Rotating Music Scores Affects Experts More Than Novices: Evidence from Eye Movements. ABIGAIL L. KLEINSMITH and HEATHER SHERIDAN, *University at Albany, SUNY* (Sponsored by W. Trammell Neill III) – To investigate the perceptual specificity of visual expertise in music reading, we monitored the eye movements of experts (\geq 10 year of experience) and novices (who could not read music) during a music-related variant of the flicker paradigm, in which participants searched for a single note in a music score that was rapidly appearing and disappearing. We manipulated the familiarity of the music's visual configurations by contrasting upright (i.e., typically oriented) music scores with those that were rotated by 90°. In support of chunking and template theories' prediction that expertise is perceptually specific, robust expertise effects were observed in the upright condition while expertise affects were attenuated in the rotated condition. Building on similar findings in other domains, music reading experts display perceptual advantages that are remarkably specific. These results support chunking and template theory's assumption that experts acquire large mental vocabularies of domain-related visual patterns.

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6:00-7:30 PM (3150)

Melody Impairs Reproduction of Novel Rhythms. ANDREW V. FRANE and MARTIN M. MONTI, University of California, Los Angeles - Melody and rhythm combine to form musical phrases. But little is known about how melody and rhythm interact in the encoding and short-term recall of rhythmic information. It has previously been suggested that melody may enhance and enrich rhythm perception, implying that rhythms can be more deeply processed (and hence more accurately recalled) if the pitches of the notes vary in some musically sensible way. To explore that hypothesis, this study randomly generated two categories of rhythmic auditory stimuli: (a) melodic sequences, each comprised of nine tones whose pitches varied within conventional Western musical constraints, and (b) non-melodic sequences, each comprised of nine tones at a single pitch. The sequences were presented to college students, who after each presentation were asked to immediately reproduce the given rhythm by tapping the spacebar on a computer keyboard. Interestingly, although the students frequently reported that the reproduction task felt easier for melodic sequences than for non-melodic sequences, reproduction performance was actually notably worse for melodic sequences, irrespective of the students' musical skill level. These findings were refined in a series of follow-up experiments.

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6:00-7:30 PM (3151)

Context-Specific Knowledge is the "Key" to Salsa Music. LAURA M. GETZ, *University of San Diego*, SCOTT BARTON, *Worcester Polytechnic Institute*, LYNN K. PERRY, *University of Miami* – Previous research has shown ways in which both formal training and informal exposure affect one's perceptual experience and the development of musical abilities. Here we asked what types of training and exposure are necessary to acquire the context-specific knowledge associated with expertise, specifically focusing on the perception of Latin salsa music. We examined "native listeners" who grew up listening to salsa music without formal training and those with musical training specific to the production of salsa rhythms. Using two clave patterns (3-2 and 2-3 *son* clave) and three constructed alternatives, we asked participants to choose the correct clave pattern for a variety of music excerpts. We found that native exposure was not enough to correctly detect the salsa-clave pairings. Rather, proficiency was only developed when training and exposure were both domain-specific. Our results show the importance of deliberate training and the degree to which expertise comes to fruition through context-specific focus. Email: Laura M. Getz, lmgetz09@gmail.com

6:00-7:30 PM (3152)

Implicit Metric Structure in the Cat in the Hat Modulates Auditory Processing. AHREN B. FITZROY and MARA BREEN, Mount Holyoke College (Presented by Ahren Fitzroy) - Strong metric structure in children's literature may support literacy acquisition, as predictive temporal structure facilitates auditory information processing. We used eventrelated potentials (ERPs) to assess implicit realization of predictive temporal structure during perception of synthesized productions of The Cat in the Hat. The productions were isochronous, with flat F0 and intensity contours. Words were presented in canonical and pseudorandom order to 24 young adults; ERPs to word onsets were generated for each beat in a 6/8 metric structure. A late negativity (330-475ms) was observed in response to metrically strong beats (1, 4) only when words were presented in canonical order, suggesting listeners parsed the implicit metric structure. Additionally, source localization demonstrated increased early evoked activity in primary auditory cortex for words aligned with beat 1 when presented in canonical order. Results demonstrate that processing implicit metric structure in speech relies on neurocognitive mechanisms involved in processing explicit metric structure in music and suggest that child-directed reading emphasizes grouping structures similar to those generated by mature neuroperceptual systems during online processing. Email: Ahren B. Fitzroy, afitzroy@mtholyoke.edu

6:00-7:30 PM (3153)

Musical and Linguistic Processing in Musicians and Non-Musicians - Evidence from a Cross-Modal Interference Paradigm. QUIN M. CHROBAK, University of Wisconsin Oshkosh, KYRA L. BOWE, University of Wisconsin Oshkosh, AARON T. KARST, University of Wisconsin Oshkosh (Presented by Quin Chrobak) - The present study explored the cognitive systems responsible for the processing of linguistic and musical information. Recent research suggests that, at least in nonmusicians, language and music share processing resources in working memory. However, it is still unclear how musical information is processed by musicians. Indeed, evidence exists to suggest that musicians may in fact develop a distinct processing resource dedicated to musical information. To explore this possibility, a cross-modal interference paradigm was used in which musicians and non-musicians were presented with an initial stimulus (words or chords), followed by an intervening stimulus (words, chords, or silence) and then presented with a comparison stimulus (words or chords). Participants indicated whether the comparison stimulus was the same or different from the initial stimulus. Results demonstrated that musicians had a larger difference between matched (e.g., music-music) and mismatched interference (e.g., music-language) conditions relative to non-musicians. This pattern would be expected if musicians had distinct resources for the processing of linguistic and phonological information.

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6:00-7:30 PM (3154)

Feature Instructions: Harmful or Helpful for Face Matching? DANIELLE M. RUMSCHIK and BRIAN L. CUTLER, University of Ontario Institute of Technology (Sponsored by Jeffery Neuschatz) - Face matching is the task of determining whether a presented person, photo, or video matches a simultaneously presented person, photo, or video. This type of task is completed every day by Border Services agents, TSA agents, and police officers in order to determine if a presented identity document matches the person in possession of the document. Previous research has shown that unfamiliar face matching has an accuracy rate at or below chance levels (e.g., Bindemann & Sandfford, 2011; Davis & Valentine, 2008; Kemp, Towell, & Pike, 1997). The current study examined how feature instructions impact accuracy rates in face matching decisions. Participants were shown five sets of 20 face matching trials (resulting in 100 trials: 50 matches, 50 mismatches) and asked to focus on a different, specific feature for each set of trials. The specific features were the eyes, eyebrows, nose, mouth, and the whole face. Results showed a significant difference in accuracy for trial type (match vs. mismatch) and for feature instructions, as well as a trial by instruction interaction. Paired comparison t-tests suggest that focusing on the eyes leads to the greatest match accuracy, but results in the worst accuracy on mismatch trials.

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6:00-7:30 PM (3155)

Challenging Mock Juror Knowledge About Memory Can Improve Evaluation of Eyewitness Evidence. COURTNEY A. KURINEC and CHARLES A. WEAVER, Baylor University (Sponsored by Charles Weaver) - People often mistake shallow understanding of how something works for deeper knowledge. These illusions of explanatory depth (IOED) exist for a variety of concepts, to include memory. We expected that weakening people's IOED for memory would lead to increased attention to expert information and potentially improved evaluation of eyewitness evidence. Mock jurors rated their perceived understanding for memory-related concepts before and after either explaining those concepts or completing an unrelated task. Jurors then read about an ambiguous criminal case; the case materials included either stronger or weaker quality eyewitness evidence for the prosecution as well as jury instructions on memory. Jurors who explained showed a greater weakening in the IOED for memory and were more skeptical of the eyewitness than those in the control condition. This effect appeared driven by a trending group by eyewitness strength interaction. Although both groups found the stronger eyewitness similarly accurate, explainers were more skeptical of the weaker quality eyewitness. These findings suggest that,

contrary to more passive methods of educating jurors, engaging in explanations can increase sensitivity to the quality of eyewitness evidence.

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6:00-7:30 PM (3156)

Effects of Verbal Description and Race in Face Identification. STACY BIRCH, DEANDRA LOGORY, and BAILEY WAGAMAN, The College at Brockport, SUNY - Describing a face after encountering it can impair identification of that face from a lineup. This effect, called "verbal overshadowing" (Schooler & Engstler-Schooler, 1990), has been amply replicated, but primarily for cases involving White individuals identifying White faces. Similar to Fallshore and Schooler (1995), we assessed how race might interact with verbal description to impact identification. White Participants (N=248) viewed a video of a staged robbery, in which the "robber" was either Black or White. Half of each group had to describe the robber's face and half completed a control task. Participants were then asked to identify the robber from a lineup photo and indicate confidence. When the robber was White, verbal overshadowing occurred, i.e., accuracy was lower, by 14%, following verbal description. However, when the robber was Black, accuracy was higher, by 9%, following verbal description. Confidence ratings showed a similar pattern. Verbal facilitation for a cross-race face in a paradigm that produces verbal overshadowing for a samerace face has not been previously reported. If replicated, this effect will need to be incorporated into accounts of the role of verbal description during eyewitness identification. Email: Stacy Birch, sbirch@brockport.edu

6:00-7:30 PM (3157)

The Animacy Effect in Eyewitness Memory. JOSHUA E. VANARSDALL and MARY OVAN, Elmhurst College -Recently, the "animacy effect" in episodic memory has received some attention in the literature. Generally described, the animacy effect is the finding that animate, living things such as people and animals are more memorable than inanimate, non-living things across a variety of memory tasks in the lab. This project sought to extend the general animacy effect finding into the real world and apply it to real problems. The current project investigated whether an animacy effect occurs in naturalistic, narrative scenes (i.e., the events leading up to a car accident), and if animacy status (whether something is animate or inanimate) interacts with a classic finding in eyewitness memory, the misinformation effect. These results extend the animacy effect in episodic memory into a naturalistic scene and explore how memory errors can impact the animacy effect. Email: Joshua E. VanArsdall, joshua.vanarsdall@elmhurst.edu

6:00-7:30 PM (3158)

Beyond the Innocence Project! An Enhanced Archival Analysis of Wrongful Convictions Using the Innocence Record. MICHAEL P. TOGLIA, Cornell University, OLIVIA N. ALFANO and GARRETT L. BERMAN, Roger Williams University, KRISTINA TODOROVIC, University of Toledo, DANIELLE M. RUMSCHIK, University of Ontario Institute of Technology (Presented by Michael Toglia) – Results from recent archival studies examining Innocence Project exoneration cases are limited by missing data. Using the Innocence Record database, we presently provide more detailed analyses of exonerees' convictions including motions, court proceedings, testimony, and judges' instructions. Given the primary cause of erroneous conviction is eyewitness misidentification, we isolated 84 "pure" cases wherein misidentification was the only pretext for conviction. Fifteen randomly selected case summaries were evaluated with an original coding scheme; results revealed more information on the causes of erroneous conviction, and that Record case information is not standardized organizationally. Furthermore, the Record webpage notes "gathering and mining effort [of public documents] is ongoing and relies on the efforts of volunteers to do so." These efforts should reduce missing case data, likely triggering a fine tuning of our coding scheme. Ideally, these endeavors will result in criminal justice reform proposals and permit moving beyond post-dictions to testing experimental predictions.

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6:00-7:30 PM (3159)

Does the Self-Administered Interview Reduce the Misinformation Effect? JASON ARNDT, ALISON KRANER, INGRID XU, JIA WU, MADISON LOTSTEIN, and DANIEL MORRIS, Middlebury College (Presented by Jason Arndt) -A key issue in eyewitness memory concerns how to limit the impact of misinformation on witnesses' later recall. While techniques such as the Cognitive Interview have been shown to enhance memory for witnessed events and reduce false recall of misinformation, the Cognitive Interview is time and resource intensive to administer and may not be possible to administer when witnesses' memories are most accurate. As a partial solution to this limitation of the Cognitive Interview, Gabbert and colleagues (2012) developed a self-administered version of the Cognitive Interview known as the Self-Administered Interview (SAI). They showed that, relative to a control condition, the SAI improved accurate memory and reduced susceptibility to misinformation that witnesses were exposed to one week later. We conducted a follow-up study to examine if these results extended to conditions where participants were exposed to misinformation immediately after completing the Self-Administered Interview. Results showed that the SAI increased susceptibility to misinformation effects relative to a no recall control condition, and therefore produces retrievalenhanced suggestibility, much like other tests of free recall (Chan, et al, 2009).

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6:00-7:30 PM (3160)

Understanding Another's Expression of Confidence. TRAVIS M. SEALE-CARLISLE, *University of Birmingham*, WENBO LIN, EYLUL TEKIN, and HENRY L. ROEDIGER, *Washington University*, LAURA MICKES, *Royal Holloway*, *University of London* – People can generally calibrate their confidence to reflect the accuracy of their memories. The type of confidence rating scale has little impact on the confidence-accuracy relationship (e.g., 0-100%, maybe-probably-definitely, etc.). One behavioural account for this finding is that it is a result of a lifetime of error feedback training. What is less known is whether people can accurately estimate expressions of confidence from other people. Would the person who made the claim (e.g., "I'm pretty sure") and the person receiving the claim assign the same probability to that statement? The behavioural account suggests yes. Because accurate interpretations of expressions of confidence matter to the legal system, in a forensically-relevant experiment, participants watched a crime, were given a lineup test, and provided a statement of confidence and then assigned it a probability value. Another set of participants assigned a probability value to the statements. There was good agreement between the probabilities.

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6:00-7:30 PM (3161)

Do Auditory Distractions Affect the Accuracy of Eyewitness Memory? KENNETH BARIDEAUX, JR., University of South Carolina Upstate, ALISA CONRADY, Appalachian State University - A large body of literature has provided evidence that eyewitness memory is oftentimes unreliable after witnessing an important event. Studies within this area of research have largely focused on the interference that occurs between encoding the important event and having to retrieve details about the event after a delay. Unlike previous research, the current study examined the role of auditory inference taking place during the event. Participants viewed a slide presentation of 48 images depicting a car burglary. During the middle portion of the presentation participants were exposed to environmental sounds, random words, or no sound. The results indicated that those exposed to auditory sounds had significantly poorer recall. However, the magnitude of the distracting effect depended on the type of sound that was presented, with speech sounds being most disruptive to recall. In addition, the results showed that participants were more confident in their recall responses when the auditory sounds were presented. Our findings suggest that exposure to distracting sounds during an event should be considered when evaluating the accuracy of eyewitness memory.

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6:00-7:30 PM (3162)

When Social Media Leads Us Astray: The Effect of Photograph Context on Evewitness Memory. BETH B. STEVENS and HEATHER KLEIDER-OFFUTT, Georgia State University (Sponsored by Sarah Barber) - Accurate eyewitness identification is dependent upon a witness' ability to accurately encode and retrieve the face of a perpetrator in a crime. Previous research indicates that intervening pictures, such as mugshot photobooks, negatively influence eyewitness memory. The current study tested whether this effect translates to intervening social media exposure. Facebook (FB) pictures of the perpetrator or foil (known innocent), that varied in positive or negative context, were presented after a crime video, followed by a lineup or show-up two days later. Lineup and showup identifications indicated that any FB exposure increased selection rate, both hits and false alarms to the foil. While only negative content increased confidence in the selection regardless of accuracy. This suggests that social media use after witnessing a crime may mimic the confusion eyewitnesses experience when viewing mugshot photobooks, thus having detrimental effects to eyewitness accuracy.

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6:00-7:30 PM (3163)

What If a Witness Was Acquainted with a Suspect Prior to a Crime? An Investigation of Unconscious Transference by Manipulating Prior Familiarity. ALEX WOOTEN, CURT CARLSON, ROBERT LOCKAMYEIR, and ALYSSA JONES, Texas A&M University-Commerce (Sponsored by Curt Carlson) - Despite a large number of documented cases in which the eyewitness was previously acquainted with the suspect, few researchers have fully explored prior suspect familiarity using a lineup paradigm. We addressed this issue with a face-learning paradigm in which participants were familiarized with a set of previously unfamiliar faces. Two days later, participants took part in a multiple-block eyewitness identification paradigm. In each of several blocks, participants viewed a target face (i.e., a perpetrator/guilty suspect) that was either familiar from Day 1 or not. Later in each block, they viewed either a lineup containing the guilty suspect or a lineup containing an innocent suspect. Critically, the suspect (guilty or innocent) was either familiar from Day 1 or not. Results indicate that participants were more willing to select familiar than unfamiliar suspects regardless of guilt. In other words, correct identifications increased for familiar guilty suspects, but innocent suspects were also more likely to be chosen if previously familiar. This latter finding replicates the unconscious transference effect. We will also present source recollection data from this study to evaluate different theories of unconscious transference. Email: Alex Wooten, alexrwooten@gmail.com

6:00-7:30 PM (3164)

Saccade-Induced Retrieval Enhancement: A Fast, Easy, and Free Way to Improve Lineup and Show-Up Performance? KEITH B. LYLE, SARAH FRENCH, and ANNA M. KELLEY, University of Louisville (Presented by Keith Lyle) - Lineups and show-ups are high-stakes tests of face memory. Unfortunately, performance is often poor. We have been investigating one potential means of improving performance. Retrieval of episodic memories is sometimes enhanced when preceded by a series of repetitive, visually-guided saccades—a phenomenon known as saccade-induced retrieval enhancement (SIRE). SIRE has previously been found on tests of face recognition and memory for forensically-relevant scenes, but it has not been studied in the specific context of lineups and show-ups. In three experiments presented here, we provide promising initial evidence that SIRE may be a fast, easy, and free way to improve lineup and show-up performance.

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6:00-7:30 PM (3165)

The Effect of Viewing Distance on Empirical Discriminability and the Confidence-Accuracy Relationship for Eyewitness Identification. ROBERT LOCKAMYEIR, CURT CARLSON, ALYSSA JONES, and MARIA CARLSON, *Texas A&M*

University-Commerce, DAWN WEATHERFORD, Texas A&M University-San Antonio, CHARLES GOODSELL, Canisius College - Despite receiving little research attention, the distance from which an eyewitness views a perpetrator has obvious realworld implications for eyewitness identification. We filmed the same mock crime (purse-snatching) with three different perpetrators, each of which was filmed at three different distances (3, 10, or 20 m). Participants took part in three experimental blocks, each of which involved watching one of the mock crimes, taking part in a brief distractor, followed by a target-present or -absent lineup. Results revealed a mirror effect, such that hit rate declined, and false alarm rate increased, with distance. Moreover, the 10 and 20 m conditions vielded worse discriminability than expected based on prior research. Confidence-Accuracy Characteristic analysis revealed a strong relationship at 3 m, but not at 10 or 20 m. However, a novel analysis showed that participants who viewed a perpetrator at 10 or 20 m were significantly less willing (compared to 3 m) to identify a suspect with greater than 50% confidence. We conclude that eyewitness memory can be highly error-prone when viewing a perpetrator from just 10 m, and the confidenceaccuracy relationship may not be resilient at longer distances. Email: Curt Carlson, curt.carlson@tamuc.edu

6:00-7:30 PM (3166)

Ensemble Averaging in Simultaneous and Sequential Lineups. BRENT M. WILSON, University of California, San Diego, KRISTIN DONNELLY, University of California, Berkeley, JOHN T. WIXTED, University of California, San Diego - The memory signals generated by the faces in a lineup are likely to be correlated because the fillers chosen by police are similar to the suspect. Because of this correlation, eyewitness memory performance can be enhanced by making use of an average "ensemble" representation of all faces in the lineup instead of considering each face in isolation. Creating an ensemble average should be easier to do for simultaneous lineups compared to sequential lineups. In an experiment designed to test this idea, participants studied six faces either sequentially (one at a time) or simultaneously (all at once) and were later asked whether or not a test face had been presented. Participants were more likely to identify the morphed average of the six study faces when those faces were presented simultaneously than when they were presented sequentially. This finding suggests that people are more likely to form an ensemble representation of lineup faces when those faces are presented simultaneously rather than sequentially, which helps to explain why discriminability for simultaneous lineups is typically greater than sequential lineups.

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6:00-7:30 PM (3167)

Relative Versus Absolute Judgment Strategies in Lineup Decision Making: Exploring Rank-Ordering Lineups. ERIC Y. MAH, *University of Victoria*, MARIO J. BALDASSARI, *Texas A&M University-San Antonio*, D. STEPHEN LINDSAY, *University of Victoria* (Presented by Eric Mah) – Lindsay and Wells (1985) proposed that eyewitnesses judging lineups can adopt either an absolute judgment strategy (AJ: compare each lineup photo to memory for the culprit) or a relative judgment strategy (RJ: compare lineup photos to each other and selecting the one most similar to the culprit). They argued that the RJ strategy results in more false identifications, particularly in the context of simultaneous, culprit-absent lineups. We experimentally manipulated strategy use via instructions. In three such tests, we found no effect of strategy instruction on false identification rates in simultaneous culprit-absent lineups. In a fourth, a rank-ordering task combined with RJ instructions slightly reduced (rather than increased) false identifications. This is consistent with recent work on the diagnostic-featuredetection hypothesis, which suggests that relative judgments promote the discounting of lineup member features that are non-diagnostic of guilt. Our current experiment explores whether a relative rank-order lineup procedure reduces false identifications while leaving correct identifications intact. Email: D. Stephen Lindsay, slindsay@uvic.ca

6:00-7:30 PM (3168)

The Impact of Motion at Encoding and Test for Same-Race and Other-Race Identifications. JESSE N. ROTHWEILER and CHRISTIAN A. MEISSNER, Iowa State University, MELISSA F. COLLOFF and HEATHER D. FLOWE, University of Birmingham (Sponsored by Christian Meissner) - It is well supported that same-race identifications are consistently more accurate than other-race identifications, a phenomenon known as the cross-race effect. Standard photo identification procedures present lineup members in a frontal pose. This presentation is inconsistent with the encoding of faces when the criminal event is witnessed. Our study investigated the presentation of lineup members in two formats: interactive such that the face could be rotated from 0° to 180° on the horizontal axis or five static angles presented simultaneously. Preliminary findings have found that the interactive lineup can reduce false alarm rates for both same- and other-race identifications compared to frontal view lineups. Our study aimed to replicate the benefits of the interactive lineup, but also demonstrate that these benefits stem from being able to rotate the face in motion, similar to what would be viewed at time of the event. To further capture that the benefits of the interactive lineup is produced by a match to encoding, our participants viewed events either in motion or in a series of static images

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6:00-7:30 PM (3169)

Perceptual Scaling Improves Eyewitness Identification. THOMAS D. ALBRIGHT and SERGEI GEPSHTEIN, *Salk Institute for Biological Studies*, YURONG WANG and FANGCHAO HE, *University of California, San Diego*, DINH DIEP, *Salk Institute for Biological Studies* (Presented by Thomas Albright) – A major focus of research on eyewitness testimony has been the manner in which an eyewitness lineup is presented. The traditional "simultaneous" (SIM) lineup is composed of facial photographs shown at the same time. One of the faces is that of the suspect and the others (fillers) are of innocent people. In the alternative "sequential" (SEQ) lineup the photographs are presented one at a time. In both lineup types, witnesses identify the perpetrator or reject the lineup if no face matches the memory from the crime scene. Because this recognition process is covert, the overt response confounds the strength of the internal response with the internal decision criterion. We describe a novel lineup procedure that employs the classical Method of Paired Comparisons and permits estimation of memory strength independent of the decision criterion. We find that this approach yields accurate identifications that are uninfluenced by decision bias. The new procedure reveals the structure of eyewitness memory that is inaccessible by traditional lineup procedures, allowing triers of fact to estimate the probative value of testimony proffered by individual eyewitnesses.

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6:00-7:30 PM (3170)

Testing Two Retrieval Strategies to Enhance Eyewitness Memory: Category and Location Clustering Recall. RUI PAULO, EMILIE JONES, and REBECCA MENDES, Bath Spa University - An initial free recall can be crucial for obtaining information from eyewitnesses and it is used in most appropriate investigative interviews. Nonetheless, recent studies provided evidence that clustering retrieval strategies, i.e. Category Clustering Recall (CCR), might also be effective for enhancing recall, and perhaps more effective than the change order mnemonic, a witness-compatible questioning, or even a free recall. This study compared three retrieval strategies (free recall, CCR, and a new strategy: Location Clustering Recall) when used as the sole form of retrieval but combined with preliminary instructions and mnemonics that constitute best practice in real investigative interviews. Participants watched a mock robbery video and were interviewed 48 hours later with either free recall, CCR, or Location Clustering Recall (LCR). Participants interviewed with CCR or LCR recalled a higher number of correct details in comparison with participants interviewed with a free recall. Report accuracy was high for all groups. This study provides further evidence of the ecological validity of CCR as well as initial evidence suggesting LCR might be effective for increasing the number of information eyewitnesses are able to recall.

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6:00-7:30 PM (3171)

Online Co-Witness Discussions Also Lead to Eyewitness Memory Distortion. SARA CADAVID, Universidad del Rosario, KARLOS LUNA, University of Minho, INÉS BOTÍA, Universidad del Rosario - Several studies have shown that, when co-witnesses exchange information, sometimes false information is presented and false memories are created. This co-witness suggestibility effect has been mostly studied in faceto-face interactions, and little is known about the impact of a virtual online discussion on co-witnesses memories. In this study, we explored whether the co-witness suggestibility effect is found following a virtual online exchange of information. To do so, we created a virtual variant of the MORI technique: participants watched a short film of a crime in their phones and then discussed the event via an instant messaging app. Half of the participants completed a memory test in paper and half in the phone. Results replicated the co-witness suggestibility
effect: false information presented by the witnesses was often incorporated in their memory and later reported as true in both tests. This research shows that face-to-face interactions are not necessary for the transmission of false information between witnesses. Communication technologies proved to be useful to induce memory distortions and study memory conformity. Email: Sara Cadavid, sara.cadavid@urosario.edu.co

6:00-7:30 PM (3172)

The Role of Valence and Arousal in the Differential False Memory Rates of Men and Women. THAD MEEKS and MORGAN TALLMAN, Southern Illinois University Edwardsville, ZACHARY POSEY, MAKYRA JETER, JOY WILLIAMS, LESLIE FRANCO, ALEC HESTER, PHILLIP SWANSON, and JACOB WATT, Southern Illinois University Edwardsville - Dewhurst, Anderson, and Knott (2012) found that women falsely recalled more negative, but not neutral, critical lures as compared to men. The current study sought to extend these findings by including both positively and negatively valenced DRM lists in a recognition memory paradigm. In addition, we manipulated the arousal levels of the DRM material. Participants studied 16 total DRM lists that varied both in valence (negative and positive) and arousal (high and low) levels. After viewing four lists, participants took a recognition test. This resulted in four total recognition tests (the order of the lists was counterbalanced). We found no gender differences in terms of negative false recognition. Women did, however, falsely recognize more positive lures than men, but only when those lures were also high in arousal. We discuss the results in terms of the differential emotional processing of men and women. Our results may differ from Dewhurst et al. for several reasons. These include the use of different DRM lists and procedures, the differential manipulation of valence and arousal, and the use of false recognition instead of recall. Further research is planned to clarify the moderating role of gender in false memory research.

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6:00-7:30 PM (3173)

Learning Falsehoods and Facts from Fiction: A Cognitive Trojan Horse. ANGEL HOUTS and WILLIAM LEVINE, University of Arkansas - Previous research has shown that readers learn both accurate and inaccurate information from fiction. The current study explored factors that might moderate the effect of the acceptance of misinformation presented in stories. First, we manipulated the plausibility of information within stories by presenting either correct information (e.g., Jupiter is the largest planet in our solar system), plausible misinformation (e.g., Saturn is), or implausible misinformation (e.g., Pluto is) in a critical assertion late in each story. Second, we manipulated whether misinformation or accurate information was presented before the critical assertion. Each story had two assertions presented prior to the critical assertion, and these too were presented as truthful, plausible misinformation or as implausible misinformation. Replicating many findings, the presentation of misinformation led to more incorrect responses to related general-knowledge questions (e.g., what is the largest planet in our solar system). Additionally, when Friday Evening

accurate information was presented before an implausible critical assertion, participants produced more misinformation, suggesting a shift in their tendency to validate information depending on recent experience.

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6:00-7:30 PM (3174)

When 'Bug' Creeps into Memory: False Memories and PORRETTA, Foreign-Accented Speech. VINCENT University of Windsor, AKI-JUHANI KYRÖLÄINEN, McMaster University, GHADIR NASSEREDDINE and LORI BUCHANAN, University of Windsor - Foreign-accented speech decreases lexical activation of target words and increases activation of phonological competitors. These modulations may impact the encoding and retrieval of words in memory. Here, we investigated the impact of foreign-accented speech on memory performance for semantically- and phonologically-related words. This study used the Deese, Roediger, and McDermott (DRM) paradigm, whereby semantically- and phonologicallyassociated word lists influence the incidence of false memory for non-presented words. False memory was measured by means of both (free) recall and recognition in 36 native English speakers. Preliminary analysis of the recall data showed that false memories were more likely for phonological lists. The preliminary results of the recognition data showed that false memories were more likely for semantic lists. Considerations of main effects and interactions related to accent type will also be discussed in this first study examining the impact of nonnative accent on memory encoding and retrieval using the DRM paradigm.

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6:00-7:30 PM (3175)

Reducing False Memories in Aging Using Prior Task Success. ANNE-LAURE GILET, FABIENNE COLOMBEL, and CHRISTELLE EVRARD, Universite de Nantes - The current study investigated whether prior task success before a Deese/Roediger-McDermott (DRM) task helps to reduce false memories recognition in older adults. In a within-subject design, 37 younger adults and 36 older adults were presented in a first step with a classic DRM task followed by a recognition test. In a second step, participants were given prior task success (a picture recognition task) before a DRM task followed by a recognition test. Results show that older adults significantly falsely recognized more critical lures than younger adults in the classic DRM task. However, in the prior task success condition, older adults falsely recognized as many critical lures as younger adults. Following prior task success, false recognitions of critical lures significantly decreased in older adults, but not in younger adults. Our results showed that prior task success enhanced episodic memory abilities in older adults by reducing their susceptibility to false memories.

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6:00-7:30 PM (3176)

Activation of Prior Knowledge and Subsequent Suggestibility to Misinformation. SHARDA UMANATH, JUAN CASTILLO, JESSICA SELIG, SARAH O. TRITSCHLER, and KEVIN SU YOUNG CHOI, Claremont McKenna College - People incorporate errors into their knowledge bases (e.g., the largest ocean is the Atlantic) despite having correct knowledge stored in memory. Surprisingly, retrieval of prior knowledge directly before exposure to misinformation does not protect against the learning of errors (Mullet et al., 2014). However, multiple-choice tests can stabilize access to marginal, or temporarily inaccessible, knowledge (Cantor, et al., 2015). Can multiple-choice tests provide a means of activating prior knowledge that ultimately protects against suggestibility? We manipulated participant activation of prior knowledge via (re)reading, a short answer test, or a multiple-choice test, before participants read stories containing misleading answers to target general knowledge questions. Re(reading) resulted in suggestibility at floor. Despite leading to a similar level of overall suggestibility as initial shortanswer testing, multiple-choice testing led to greater correction of initially wrong answers on a final knowledge test. Exposure to lures during initial knowledge activation may enhance the accessibility of a wider net of related knowledge, ultimately allowing for correction of misconceptions. Email: Sharda Umanath, sumanath@cmc.edu

6:00-7:30 PM (3177)

Distractor-Induced Forgetting in the Item-Method Directed Forgetting Paradigm as a Function of Item Duration. PELIN TAN, University of Waterloo, WILLIAM E. HOCKLEY, Wilfrid Laurier University (Sponsored by William Hockley) - We examined whether math distractors as analogs to Forget cues in the item-based directed forgetting (DF) paradigm produces a comparable DF effect. Participants in the DF condition saw words one at a time, followed by either a Remember or Forget cue while those in the distractor condition saw words followed by either a blank screen or math distractor. In the DF condition, participants were asked to only remember the Remember-cued words while in the distractor condition, they were to commit all items to memory. In Experiment 1, we presented items for 2000ms and cues for 3000ms and found an effect of DF but no effect of the math distractor. In Experiment 2, we reduced item duration to 500ms without changing the cue duration. Results revealed a significant effect of distractor where performance for items followed by math distractors were lower. The results support the selective rehearsal account of item-based DF. Email: William E. Hockley, whockley@wlu.ca

6:00-7:30 PM (3178)

Social Transmission and Collective Remembering of False Memories. RAEYA MASWOOD, CHRISTIAN C. LUHMANN, and SUPARNA RAJARAM **Q**, *Stony Brook University* – How does collaboration influence the production, propagation, and convergence of false memories in social groups? We tested this question by employing the DRM paradigm (Roediger & McDermott, 1995) with two common methods of group recall1) free-for-all, where unrestricted interaction among members allows discussion and editing; 2) turn-taking, where members take turns to recall making interactions more restricted. The baseline consisted of individual recall and the pooled recall of an equal number of individuals. Consistent with past findings, turn-taking increased false memory production whereas free-for-all curtailed it during collaborative retrieval and in later individual recall. Beyond past findings, we examined collective false remembering. Turn-taking reliably increased collective false memory among former group members; this effect was weaker following free-for-all interaction. Even when information lends itself to creation of false memories (DRM critical lures), interaction style influences false memory production both during and after collaborative retrieval. Email: Suparna Rajaram, srajaram02@yahoo.com

6:00-7:30 PM (3179)

Could the First Item in a DRM List Be a Trigger for False Recall When the Critical Lure Is Strongly Associated to It? YAYOI KAWASAKI, Osaka City University, MATIA OKUBO, Senshu University - To investigate the effect of strength of semantic associations on false memory, we created two types of word lists for the DRM paradigm by controlling the strength of semantic associations of list items. For half of the lists, the first item had a strong associate value (more than 50%), while for the other half the first item had a medium associate value (33% or less). If the first list item triggers false memory, we hypothesized that the lists with strong associate first items would produce more false memories than the lists with medium associate first items. 247 university students took part in this experiment with their smartphones. After observing each list, participants recalled the list items. False recall rates did not differ between the two list conditions. Hence, the associate value of the first list item might not relate to the rate of false recall. Email: Yayoi Kawasaki, yayoi@iris.dti.ne.jp

6:00-7:30 PM (3180)

Surprising Event Boundaries Modulate Hippocampal Activity and Distort Memories. ALYSSA HANNAH SINCLAIR, Duke University, GRACE M. MANALILI and MORGAN D. BARENSE, University of Toronto - Through the process of reconsolidation, memories can be destabilized and distorted. Recent research has proposed that prediction error, or surprise, is a critical prerequisite for reconsolidation. Yet, the neural mechanisms of this process remain elusive, particularly with regards to complex naturalistic memories. In our novel fMRI paradigm, we demonstrated that prediction error drives episodic memory reconsolidation. On Day 1, the Experimental group (N=24) viewed 70 narrative videos. During the Day 2 fMRI session, we reactivated memories by presenting the videos again. Critically, we elicited surprise by interrupting half of the videos before the narrative conclusion. On Day 3, we tested recall memory. Control group participants (N=24) completed the memory test on Day 2, preventing the hours-long reconsolidation process. Interrupting videos during reactivation significantly increased false memories in the Experimental group, but not the Control group. After interrupted videos, post-event hippocampal activity was suppressed; surprising interruptions may increase false memories by disrupting episodic binding. For the first time, we implicate the neural correlates of episodic memory distortion after surprising event boundaries.

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6:00-7:30 PM (3181)

Memory Attack by Semantic Mediator: Causing Retroactive Interference via Deese-Roediger-Mcdermott Lists. KELLY A. BENNION, MYTIEN LE, and MCKENNA KUMNICK, California Polytechnic State University, JAMES W. ANTONY, Princeton University - Semantic similarity can cause false memories, but the extent to which it causes retroactive interference has been less explored. Here, in phase 1, participants learned unique locations for words that reliably produce false memories in the Deese-Roediger-McDermott paradigm. Next, participants centrally viewed words that were semantically related to half of the phase 1 words. Finally, participants retrieved the locations from phase 1 (to test recall) and distinguished the words in phase 1 from previously unseen words (to test recognition). Spatial memory of phase 1 words was significantly worse for words whose semantic associates were shown (vs. not shown) in phase 2, suggesting that semantic material caused retroactive interference, even on a test of unrelated content (i.e., spatial versus semantic). Despite this interference, noticing (vs. not noticing) the semantic similarity between phase 1 and phase 2 words was helpful for recognition memory of interfered words.

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6:00-7:30 PM (3182)

How Does the Production Effect Influence the DRM Illusion? JESSICA L. CULBRETH, Furman University, ADAM LEWIS PUTNAM, Furman University - The DRM paradigm has been shown to reliably produce false memories for unstudied critical lures. Prior research has shown encoding DRM lists using image generation reduces false recognition of critical lures at test. In the present study we examined whether reading words aloud would also reduce false recognition (i.e., the production effect). Subjects studied 8 DRM lists by speaking half of the lists aloud and reading half of the lists silently before taking a recognition test. As expected, subjects showed a production effect for the studied words, with a higher hit rate for the words studied aloud than studied silently. In contrast, the false alarm rate for the critical lures was similar for both the silent and aloud lists. The implications for how production affects activation and monitoring within in the DRM is discussed.

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6:00-7:30 PM (3183)

The Effect of Diurnal Changes on Memory for Environmental Sounds. JUSTYNA OLSZEWSKA, *University of Wisconsin Oshkosh*, JOANNA ULATOWSKA, *Nicolaus Copernicus University*, ALLISON SMITH and MARJORIE PETERSON, *University of Wisconsin Oshkosh* – According to Folkard (1979) people placed more reliance on verbal maintenance processing in the morning than in the evening, meaning that more memory errors occurred for phonologically similar words in the early hours. However, it is still unknown whether a specificity of verbal material or the modality in which words were presented are subject to diurnal changes. We aimed at testing short- and long-term memory performance for auditorily presented stimuli that lack a language component in order to verify whether only auditory-verbal material were sensitive to diurnal changes. We used sets of similar environmental sounds that did not contain a language component and that engaged only auditory modality. Participants studied sets of similar meaningful and meaningless sounds and responded to a single probe (studied or non-studied). Acoustically similar sounds were recognized more often following morning presentations as compared to evening ones. This effect was noticed for both types of sounds, meaningful and meaningless in STM. In LTM a trend toward greater sensitivity to acoustic similarity was reported. It is suggested that an acoustic component, rather than a phonological component, plays a crucial role in diurnal changes.

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6:00-7:30 PM (3184)

Does Articulatory Suppression of Phonological Coding Affect Short- and Long-Term False Memory? YONCA CAM and DAWN M. MCBRIDE, Illinois State University, JENNIFER H. COANE, KAI CHANG, NINA ANTONE, and YANQIQI ZENG, Colby College (Sponsored by Jeffrey Wagman) - False memory research has been widely examined in long-term memory (LTM) using the DRM paradigm; however, there is evidence that false memory occurs in short-term memory (STM) as well. Recently, we found higher false alarms for phonological than semantic lures at short-term tests and higher false alarms for semantic than phonological lures at long-term tests. Abadie and Camos (2018) argued that false memory in STM only occurs when working memory maintenance is disrupted by a secondary task, but they only included semantic lists. Given the phonological dominance of coding in STM, it is possible that the effects of maintenance disruption might differ as a function of list type. The current study investigated the effect of articulatory suppression on false memories for semantic and phonological lists in STM and LTM. Although the results replicated our previous finding of an interaction between list association type and test delay, articulatory suppression did not interact with either factor. These results do not indicate that maintenance disruption differentially affects semantic and phonological false memories regardless of test delay. Email: Yonca Cam, ynccam@gmail.com

6:00-7:30 PM (3185)

Can a Warning Inoculate Witnesses Against Retrieval Enhanced Suggestibility? KRISTA D. MANLEY, University of Montana, JASON C.K. CHAN and RACHEL O'DONNELL, Iowa State University (Sponsored by Jason C.K. Chan) -Despite the robust memory-enhancing benefits of retrieval practice, it can ironically exacerbate eyewitness' susceptibility to later misinformation - a phenomenon known as Retrieval-Enhanced Suggestibility (RES). One way to inoculate witnesses against this effect is to warn them about potential inaccuracies of subsequent information (Thomas, Bulevich, & Chan, 2010). Although this result is promising, it has not yet been replicated. In the current experiments, subjects first witnessed an event, then half were given a memory test over the event. Next, subjects were exposed to misinformation about the event. Half of the subjects were then given a warning about the accuracy of the narrative before they took the final test. In Experiment 1,

we replicated the inoculating effects of warning on RES from Thomas et al. (2010). In Experiment 2, a 48-hr delay separated the warning and final test, and the warning remained effective in reducing the RES effect.

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6:00-7:30 PM (3186)

The Role of Volitional Deception on Memory for the Truth. RACHEL E. DIANISKA and CHRISTIAN A. MEISSNER, Iowa State University (Sponsored by Christian Meissner) -Research suggests that the type of lie a person tells can influence how well it is remembered; however, prior studies have largely relied upon experimenter-instructed lies. Here, we examine the influence of volitional deception and the type of lie provided (omission vs. commission) on memory for the act of deception. Participants performed a set of actions with objects, then either truthfully or untruthfully denied or described performing an action. We manipulated whether participants were able to choose which items they would lie or tell the truth about, and whether participants made predictions about their future performance. One-week later, participants' memory for the original experience was assessed using a source memory test. Findings will be discussed with respect to the effect of choice as an important moderator on the relationship between lying and memory.

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6:00-7:30 PM (3187)

The Effects of Picture-Word Mismatch in the DRM Paradigm. JUSTIN THIBAULT, DONALD J. SKINNER, REBEKAH E. SMITH, and REED HUNT, University of Mississippi - An important discovery in false memory research is Israel and Schacter's (1997) finding that presenting pictures at study reduces false memory in the DRM paradigm, a result that has been replicated many times. The standard interpretation is that memory for visual processing of the pictures can be used to reject the critical distractors, which were not explicitly present at study. Beginning from the empirical observation that the pictures used by Israel and Schacter are not consistently labelled with the DRM word they are supposed to represent, we investigated whether it is the presentation of pictures or the mismatch between the pictures and the words that reduces false memory. We found evidence suggesting that the mismatch between words and pictures plays a significant role in reducing false memories within the DRM paradigm. We also discuss effects on correct memory as a function of picture-word match. Email: Reed Hunt, reed@olemiss.edu

6:00-7:30 PM (3188)

Social Anxiety and False Memory: New Insights for the Mood Induction Literature. MILES M. SCHILLER and STEPHANIE A. KAZANAS, *Tennessee Technological University* (Sponsored by Todd Kahan) – Deese (1959) and Roediger and McDermott (1995) suggest that items presented to participants are remembered at the same level as critical lures not presented. More recent work has shown negativelyemotional words can increase the false recall of negative words (White, Kapucu, Bruno, Rotello, & Ratcliff, 2014). In this study, we examined the effect of induced anxiety on the occurrence of false memory in participants. Anxiety was measured using the PANAS questionnaire (Watson, Clark & Tellegen, 1988). We hypothesized: (1) Participants with induced anxiety would recall more false memories (lures) across lists than those in a control condition; (2) The "fear" word list would have the highest false recall; (3) Recall accuracy would be highest for negative word lists across conditions; and (4) Recall accuracy would be higher for negative and positive word lists than neutral lists. Our results speak to the effect of mood on memory and the extent to which it influences false memories.

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6:00-7:30 PM (3189)

Warning Against Misinformation: An Investigation into Retrieval Enhanced Suggestibility. ALIA N. WULFF, Tufts University, JESSICA M. KARANIAN, Fairfield University, ELIZABETH RACE and AYANNA K. THOMAS, Tufts University - In a misinformation paradigm, participants witness an event, are presented with post-event information, and then take a test on the original event. Misleading post-event information negatively impacts memory for the original event. Memory is further impaired when a test of the original event is given before the post-event information. We investigated how (1) warning against misinformation and (2) increased retention intervals between the event and initial test would impact memory accuracy and the confidence/accuracy relationship. In two experiments, we compared participants who were given a post-narrative warning to those who were not warned. In Experiment 1 we tested participants in a single session, while in Experiment 2 we introduced a 24-hour retention interval after the witnessed event. We found that the warning reduced the misinformation effect and improved the confidence/accuracy relationship. This provides further information about potential mechanisms that have been introduced to explain repeated testing within the misinformation paradigm. Email: Alia N. Wulff, alia.wulff@gmail.com

6:00-7:30 PM (3190)

One Bad Apple: Visual Memory and Misinformation for the Apple Logo. ALAN D. CASTEL, MARY C. WHATLEY, SHAWN T. SCHWARTZ, JESSICA BLOCK, and ALEXANDER L.M. SIEGEL, University of California, Los Angeles (Presented by Alan Castel) - While visual memory has a vast capacity, memory for the details of everyday frequently seen objects (such as the ubiquitous Apple logo) can be surprisingly poor (see Blake, Nazarian, & Castel, 2015). Attentional saturation via repeated exposure may lead to a more gist-based memory, and a less stable representation of the image that is prone to interference effects. To test this, we investigated the effect of visual misinformation (i.e., a single exposure of an altered version of the Apple logo) on subsequent recognition memory for the logo. In two experiments, participants rated how much they liked the Apple logo while viewing it either in its true form or a slightly altered form (i.e., the bite on the wrong side). Participants then completed a surprise recognition task in which the altered logo was presented as an answer choice. Viewing the altered logo led to lower recognition of the correct Apple logo but did not alter confidence, suggesting that while misinformation changes memory performance, it does not have a similar effect on one's confidence in memory. Thus, interference can alter visual memory such that well-known iconic visual images are susceptible to misinformation. Email: Mary C. Whatley, mcwhatley@ucla.edu

6:00-7:30 PM (3191)

Consolidation Without Intention: Sleep Strengthens Memory for Information That is Not Expected to Be of Later Use. ELLE M. DELGROSSO-WERNETTE and KIMBERLY M. FENN, Michigan State University (Sponsored by Kimberly Fenn) - To better elucidate what information is consolidated during sleep, we investigated the extent to which sleep consolidates memory when information is not actively remembered. In three experiments, we asked participants to incidentally encode words and gave them a surprise recognition test after a retention interval containing either sleep or wake. Results from Experiments 1 and 2 suggest that sleep consolidated gist-based and veridical memory. We speculate that consolidation may depend on the strength of memory traces. To test this prediction, in Experiment 3, we manipulated memory strength by having participants rate items either one time or three times and gave them a surprise test following sleep or wake. We predict that sleep will consolidate memory for words rated three times but not those rated once. Taken together, these experiments provide preliminary evidence that when information is not actively remembered, sleep acts on memory based on the strength of its traces.

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6:00-7:30 PM (3192)

The Role of Psychological Distance in Predicting Future Preferences. ANNICK N. TANGUAY, Rotman Research Institute, JOSHUA L. RUTT, University of Ottawa, LOUIS RENOULT, University of East Anglia, CRISTINA M. ATANCE, University of Ottawa - People underestimate how much their preferences will change over time. However, this presentism bias is attenuated when social distance increases (e.g., when thinking about the preferences of a generic peer). Here, we compare whether this effect of "social distance" is comparable to another form of psychological distancing (Liberman & Trope, 2014), "spatial distance" (predicting one's future preferences while imagining being "here" vs. "far away"). Forty-five and 49 young adults completed the spatial and social versions of the preferences task, respectively. A mixed ANOVA showed that social and spatial distance produced distinct effects (p < .01) on predicting future preferences. We replicated the beneficial effect of social distance but found no effect of spatial distance. These findings suggest that psychological distance, broadly-speaking, is not the key factor in improving people's predictions about future preferences but, rather, distancing between self and other (or social distance), more specifically.

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6:00-7:30 PM (3193)

Attention Control and Prospective Memory Performance. JESSIE D. MARTIN, Georgia Institute of Technology (Sponsored by Zach Shipstead) - Only recently have efforts focused on the role of individual differences in prospective memory performance (Brewer et al., 2010). Specifically, the degree to which individual differences in cognitive ability inform ongoing task performance remains under-investigated. Moreover, the ability to measure the very costs that occur when a prospective memory intention is required has been largely limited to reaction-time difference scores, a method of dubious reliability (Cronbach & Furby, 1970; Draheim et al.). To better understand prospective memory performance and the cognitive processes that underlie successful retrieval of an intention, the field must move beyond evaluations of the tasks themselves to the underlying mechanisms that contribute to performance, as well as critically evaluating how processes within the task are measured. This study with 293 subjects showed that, at the latent level, distinctions between focal and non-focal prospective memory conditions are not as different as experimental studies have suggested. Results suggested a single factor solution with all types of prospective memory performance predicted primarily by a latent attention control construct. Email: Jessie D. Martin, Jessie.martin@gatech.edu

6:00-7:30 PM (3194)

Prospective Memory: Effects of Misleading Contextual Information. ANNE E. VOGEL and ALEXANDER J. KUKA, University of Mississippi, JOSHUA L. BRUNSMAN, University of Texas, San Antonio, REBEKAH E. SMITH, University of Mississippi - Prospective memory (PM) tasks, or remembering to perform an action in the future, can show benefits from contextual information on PM accuracy and in terms of more efficient allocation of attention. Participants in the current study completed an ongoing task in which they viewed photographs representing a walk through a familiar campus environment and decided whether there were six or more people in each photograph. For the PM task, participants were told to remember to return a book to a friend and for all participants the target person appeared approximately halfway through the ongoing task. Some participants were given accurate contextual information that allowed them to anticipate where the friend would be on campus. Other participants were given inaccurate or no contextual information. A control group performed the ongoing task only. Results show benefits of accurate contextual information and negative effects of inaccurate information. Email: Rebekah E. Smith, rebekah@olemiss.edu

6:00-7:30 PM (3195)

Prospective Memory Encoding: Effects of Encoding Duration and Divided Attention. WINSTON E. JONES and MICHAEL K. SCULLIN, *Baylor University* – Prospective memory (PM), or remembering delayed intentions, is a necessity for the timely completion of daily activities. It is unclear whether intention formation is always resource-demanding or can sometimes occur "in passing." To test these views, 154 participants were randomly assigned to three encoding conditions. In the control condition (n=52), participants were given 40 seconds to encode the categorical prospective memory task to remember to press the Q key whenever a fruit word occurred during a lexical decision task. In the experimental conditions, participants had to simultaneously monitor for odd digits (divided attention; n=50), or were given only 15 seconds to encode (brief encoding; n=52). During a later test block, the divided attention and brief encoding conditions detected significantly fewer PM targets than the control group. Therefore, intention formation requires time and resources for elaboration and intention-content binding.

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6:00-7:30 PM (3196)

Performance on Laboratory Event and Time-Based Prospective Memory: Roles of Aging, Working Memory, Implicit Memory, Retrospective Memory, and Executive Functioning. MICHEL ISINGRINI, SEVERINE FAY, LUCIE ANGEL, LAURENCE TACONNAT, SANDRINE VANNESTE, and BADIAA BOUAZZAOUI, University of Tours - We investigate whether differences in retrospective memory, implicit memory, executive functioning, and working memory accounted for differences and age group-related differences on two laboratory prospective memory tasks, event and timebased. One hundred forty-six participants, between 25 and 75 years old, divided into three age-groups, were tested. Results indicated a negative age-group effect on both prospective memory tasks, however in a greater extent for the time-based task, and on all neuropsychological measures. Regressions analyses, with education partialled out, indicated that predictors of performance differ between the two prospective memory tasks. The main predictors for time-based task were executive functioning, retrospective memory and working memory respectively. Regarding the event-based task, implicit memory, retrospective memory and executive functioning were the main predictors respectively. These variables also appeared as the main mediators of the relationship between age-group and prospective memory. Results highlight the crucial role of control processes to account for the functioning and age-related differences in time-based prospective memory, and of memory priming in event-based prospective memory.

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6:00-7:30 PM (3197)

Toward a Better Understanding of Costs in Prospective Memory: A Meta-Analytic Review. FRANCIS T. ANDERSON, MICHAEL J. STRUBE, and MARK A. MCDANIEL, *Washington University in St. Louis* (Sponsored by Mark McDaniel) – In prospective memory (PM) research, a common finding is that people are slower to perform an ongoing task with concurrent PM demands than to perform the same task alone. This slowing, referred to as costs, has been seen as reflecting the processes underlying successful PM. Historically, costs have been interpreted as evidence that attentional capacity is being devoted towards detecting PM targets (monitoring). A new account, termed delay theory, instead suggests that costs indicate a strategic speed/accuracy adjustment in favor of accuracy, allowing more time for PM-related information to reach threshold. Taking a meta-analytic approach, we reviewed studies in the PM literature that have reported ongoing task performance, both with and without a concurrent PM task, identifying key factors suitable for the meta-analysis. Next, we analyzed the data of these studies, using our factors as moderators in a series of meta-regressions, to determine their impact on the presence or magnitude of PM-related costs. Finally, we interpret the results of the meta-analysis from both monitoring and delay perspectives in an effort to better understand the nature of costs and what they reflect about the underlying cognitive processes involved in PM. Email: Francis T. Anderson, anderson.f@wustl.edu

6:00-7:30 PM (3198)

Confidence Ratings About Judgment of Plan Existence. TAISUKE MORITA, Tokyo University of Science - Successful prospective memory performance sometimes depends on the ability to judge whether there is something to do at a certain time. For example, if we mistakenly believe that there is nothing to do this evening when we actually have an appointment, an omission error will occur. The errors caused by such misjudgments might be prevented if we accurately monitor whether our judgment of plan existence is correct or not. In this study, we examined the extent to which our confidence ratings about such judgments are accurate. We presented participants with dates and asked them to judge whether there was something to do on each date, without consulting their schedule books. We also asked them to rate the confidence of their judgments. Then, we instructed them to check the correctness of their judgments by consulting their schedule books. Results showed that the confidence ratings were significantly lower when the judgments of plan existence were incorrect, than when they were correct. We discuss the results from the perspective of cognitive structures involved in successful judgment of plan existence in everyday situations. Email: Taisuke Morita, tmorita@rs.tus.ac.jp

6:00-7:30 PM (3199)

Offloading Elements of a Prospective Memory Task. MELISSA J. GUYNN, ADAM G. UNDERWOOD, and OSCAR J. LOPEZ, New Mexico State University - A prospective memory task is one in which an intended action must be performed at an appropriate point after a delay, amidst ongoing activities, without a prompt to remember. Performance requires remembering the action to be performed and the point to perform it, and recognizing that point when it occurs. This can be demanding, as evidenced by the fact that performance on the ongoing activities often slows down (i.e., task interference). We attempted to offload each of the components to the environment to assess any effect on task interference. The prospective memory task was to say three intended action words aloud if any of three target words appeared during a lexical decision task. Interference occurred only in the no-offloading condition. Re-presenting the target or intended action words, or signaling possible opportunities to perform the prospective memory task, eliminated task interference. We used our 4-quadrant paradigm to disentangle retrieval mode and target checking. Results suggested a retrieval mode caused the task interference. A

methodological element may have obscured evidence of target checking. Prospective memory was best in the conditions where either the target or intended action words were offloaded. Email: Melissa J. Guynn, mguynn@nmsu.edu

6:00-7:30 PM (3200)

The Role of Multitasking in Task Order Choices. SELENA R. VILLARREAL and DAWN M. MCBRIDE, Illinois State University (Sponsored by Dawn McBride) - Recent studies suggest that participants will choose to do some tasks first even at the expense of extra effort in order to reduce one's cognitive load, a phenomenon called precrastination by Rosenbaum et al. (2014). This result has been found with both perceptual-motor and cognitive tasks. The aim of the current study was to investigate the role of multitasking in these findings. Participants were asked move boxes on a computer screen. They were also asked to generate category items at a time of their choosing during the box moving task. However, the category was withheld until participants stated they were ready to complete the generation task to prevent them from generating items subvocally while moving boxes. Results indicated that participants precrastinated less than in a previous study (VonderHaar et al., 2019), suggesting that multitasking is not a likely contributor to these task order choices. Email: Selena R. Villarreal, srvilla@ilstu.edu

6:00-7:30 PM (3201)

Motivational Influences on Prospective Memory and Metacognition. JESSICA Y. HACKER, Louisiana State University, CALLI BIANCHI and JILL T. SHELTON, University of Tennessee at Chattanooga - Remembering to complete future intentions (i.e., prospective memory) can be supported by selfinterested and pro-social motives. Across two experiments, we examined how motivational influences moderated prospective memory in laboratory and real-world settings. In general, prospective memory was better in the laboratory relative to the real-world. In both settings, the potential to earn a monetary reward for oneself led to superior prospective memory relative to earning a reward for a friend. In contrast, when motivation was manipulated through context priming, a prosocial advantage was observed. We had a secondary interest in participants' ability to gauge their own prospective memory performance, which was assessed through performance predictions. Overall, metacognitive accuracy was better in the laboratory than in the real-world. Furthermore, the prospective memory advantage due to motivational orientation was accompanied by greater metacognitive accuracy. Taken together, these findings shed light on the importance of examining how social motivational factors and task setting influence cognition. Email: Jill T. Shelton, jill-shelton@utc.edu

6:00-7:30 PM (3202)

The Effects of Task Duration and Cognitive Load on Time Estimation. GUY LACROIX, JESIKA WALKER, MOHAMMED ASWAD, BILLAL GHADIE, and LINDSAY MORGAN, *Carleton University* – This experiment examined participants' ability to keep track of time during a visual and memory search task where task difficulty and duration were

manipulated. Two hundred and ninety-two participants performed the task for eight or 58 minutes. Participants in the prospective time judgment condition were forewarned of an impending time estimate whereas those in the retrospective condition were not. Cognitive load was manipulated and assessed by assigning participants to either a consistent or a varied mapping condition. The results revealed significant overestimation and higher variability of responses in the prospective condition compared to the retrospective one in the eight-minute task only. Moreover, participants significantly overestimated the duration of the eight-minute task and underestimated the 58-minute task on average. Cognitive load had no effect on participants' time estimates, however. Thus, the well-known cross-over interaction between cognitive load and time judgment condition for durations under two minutes does not seem to extend to longer ones.

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6:00-7:30 PM (3203)

Sequential Presentation Moderates the Benefit of Context Variation in a Transfer Task. ANDREW B. LOGIUDICE and GEOFF NORMAN, McMaster University, KULMAKAN KULASEGARAM, University of Toronto, SANDRA MONTEIRO and SCOTT WATTER, McMaster University (Sponsored by Michael Humphreys) - Using a concept learning task, Kulasegaram et al. (2017) found that learners who solved a sequence of training problems in varying contexts (e.g., Laplace law problems in the digestive, circulatory, and respiratory systems) later showed superior transfer than learners who solved a series of training problems only in one context. The authors hypothesized that context variation enhanced subsequent transfer by de-emphasizing surface features, thus helping learners focus on each training problem's deep structure. This hypothesis predicts that context variation per se during training should be sufficient to enhance subsequent transfer. Here we report data inconsistent with this prediction. We replicated the context variation effect in Exp. 1A when training problems were presented in sequence (p = .02, d = .63), but eliminated it in Exp. 1B by presenting already-solved training problems and their solutions beside subsequent to-be-solved training problems (Context Variation x Experiment: p = .01). Contrary to the above hypothesis, we suggest context variation improved transfer by forcing learners to solve training problems with prior examples less accessible in memory. Potential implications for educational practice will be discussed.

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6:00-7:30 PM (3204)

Is Immersive Virtual Reality Too Distracting for Learning? JOCELYN PARONG and RICHARD E. MAYER, *University of California, Santa Barbara* (Sponsored by Richard Mayer) – Students and teachers report high support for using immersive virtual reality (IVR) consoles in classrooms. However, features of IVR, such as extraneous sounds, animations, and interactions that are not relevant to the lesson, may actually be distracting to cognitive or affective learning processes. To examine this distraction hypothesis, an experiment was conducted in which students viewed a history lesson either in IVR or in a desktop video containing the same content. Results showed that students who viewed the video lessons outperformed those who viewed the IVR lessons on transfer tests. Students in the IVR conditions reported experiencing higher extraneous cognitive load than those in the video conditions, although there were no differences in cognitive engagement or workload based on EEG measures during the lesson. Concerning affective processing during learning, students in the IVR conditions were more likely to report positive/active emotions, less likely to report negative emotions during learning, and displayed higher heart-rate compared to the students learning with a slideshow. Overall, immersive environments may create emotional arousal during learning, which leads to poorer learning outcomes than conventional media.

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6:00-7:30 PM (3205)

Generative Strategies for Learning from Video Lessons in Stem. LOGAN FIORELLA, University of Georgia, ANDREW T. STULL, University of California, Santa Barbara, SHELBI KUHLMANN, University of Georgia, RICHARD E. MAYER, University of California, Santa Barbara - This study explored strategies to support learning from a video lesson about the human kidney. 196 college students were randomly assigned to a video format condition and a learning strategy condition. Students listened to oral explanations from the instructor as they viewed a series of static diagrams (static visuals) or the same diagrams dynamically drawn (instructor-generated visuals). After each part of the video, students wrote verbal explanations (explain) or created drawings (draw), or they rewatched that part of the video (rewatch). All students then completed retention and transfer tests. Results indicated significant main effects of learning strategy for retention and transfer (explain group > draw group = rewatch group; *d's* from .58 to .87). There was also a significant video format by learning strategy interaction for transfer: explaining was most effective for students who observed instructor-generated visuals (d's > 1.0) rather than static visuals (d's < .5).

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6:00-7:30 PM (3206)

Is a Picture Worth a Thousand Words? The Effect of Photo Taking and Note Taking on Memory. REBECCA LURIE, JOSEPH CLARENCE WILSON, and SAMIRA DODSON, Binghamton University, SUNY (Sponsored by Deanne Westerman) - Past studies have shown that taking a photograph impairs memory for the photographed information (Henkel, 2014; Soares & Storm, 2018). Two experiments evaluated photo taking as a means of note taking in an educational setting. Participants were presented with facts and lecture-style videos and were asked to interact with the material in one of three ways: just viewing the material without taking notes, taking handwritten notes while viewing, or taking photos while viewing. When participants were not given a chance to review notes before the test, simply viewing the information led to the best memory performance, with no difference found between the photo and note taking conditions. When participants did review notes before the test, the just-viewing condition, again,

led to better performance than photo taking, with note taking falling between viewing and photo taking. Overall, the results show that the memory-impairing effects of photo taking extend to educationally relevant materials.

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6:00-7:30 PM (3207)

Effects of Bilingualism, Language Proficiency, Modality, and Concreteness in Foreign Language Word Learning. NAOKO TSUBOI, University of Texas, El Paso, EMMA R. BOUSHKA, OSCAR I. NAJERA, ALEJANDRA NEVAREZ, and WENDY S. FRANCIS, University of Texas, El Paso (Sponsored by Wendy Francis) - In previous research on learning vocabulary in an unknown language, bilingual learners generally outperformed monolingual learners. However, most studies had small sample sizes or groups that were not well matched. None had a rigorous investigation of the effects of language dominance or proficiency in the language with which the foreign words were paired. We tested these effects with well-matched participant samples and examined the effects of learning modality and concreteness. Participants were 48 English-speaking monolinguals, 48 English-dominant bilinguals, and 48 Spanishdominant bilinguals, classified based on objective standardized language assessments. These groups were matched on age, education, socioeconomic status, and non-verbal cognitive ability. Participants learned Japanese vocabulary by viewing or listening to Japanese-English translation-equivalent word pairs and repeating them. In cued-recall tests, Japanese words were presented and English equivalents were to be provided. In a final associative recognition test, studied Japanese and English words were paired correctly or incorrectly. The effects of bilingualism, language proficiency, presentation modality, and concreteness were examined.

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6:00-7:30 PM (3208)

A Randomized Controlled Trial of Interleaved Mathematics. DOUG ROHRER, ROBERT F. DEDRICK, CHI NGAI CHUENG, and MARISSA K. HARTWIG, University of South Florida - Every school day, tens of millions of students complete a set of mathematics practice problems that can be solved with the same strategy, such as solving each of 10-word problems with the Pythagorean Theorem. In an alternative approach known as interleaved practice, problems are arranged so that no two consecutive problems can be solved by the same strategy, and this format forces students to choose an appropriate strategy for each problem on the basis of the problem itself. In the present study, we assessed the efficacy and feasibility of interleaved practice in a preregistered, cluster randomized controlled trial that took place in 54 seventh-grade classes. Each class periodically received mostly blocked or mostly interleaved assignments over a period of four months, and then every class completed an interleaved review assignment. One month later, students took an unannounced test, and the mostly-interleaved group outscored the mostly-blocked group, 61% vs. 38%, d = 0.83. Although important caveats remain, the results suggest that most students would benefit from a greater dose of interleaved mathematics practice. Email: Doug Rohrer, drohrer@usf.edu

6:00-7:30 PM (3209)

Visuospatial Ability Predicts Academic Performance in a College Calculus Course. ABBEY M. LOEHR, Washington University in St. Louis, EMMA SMITH ZBARSKY, Wentworth Institute of Technology, DAVID B. MIELE, Boston College, ANDREW C. BUTLER, Washington University in St. Louis - Success in calculus is an important prerequisite for STEM fields, but many students struggle to learn calculus (Bressoud et al., 2015). To better understand student difficulties and how to support learning, we examined factors that contribute to student success in a large, multi-section calculus course at an urban technical university. Specifically, we investigated relationships between students' motivation, cognitive ability, and calculus knowledge. Students completed a pre-course survey that measured motivation-related constructs (perceived academic competence, value, mindset, and regulatory focus) and visuospatial ability. At the end of the course, they took a cumulative final exam. Complete data were available for 110 students. Significant, moderate to strong interrelations were found among almost all motivation measures. Interestingly, visuospatial ability emerged as the strongest predictor of academic performance in the course, and it was positively associated with mindset. The ability to visualize and mentally manipulate mathematical information may be important for learning calculus.

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6:00-7:30 PM (3210)

Instruction in Learning Strategies and Behavior Change: Outcomes in Undergraduates. JENNIFER A. MCCABE and DARA G. FRIEDMAN-WHEELER, Goucher College -This study examined knowledge-based, metacognitive, and behavioral outcomes from in-class interventions designed to teach undergraduates about effective learning strategies (spacing, elaboration, and testing, abbreviated "SET") (LS condition) and about behavior-change techniques to support actual adoption of new study behaviors (LS+BC condition). In comparison to the control group, intervention participants showed enhanced knowledge of the "SET" strategies and a trend toward improved scores on a metacognition subscale representing the use of organizational strategies. The LS group rated testing as more helpful, reported higher use of elaboration and testing, and had marginally higher final course grades than the control group. In addition, growth mindset was associated with greater intervention gains on some measures. Overall, the LS intervention was helpful, but additional behavior-change training did not further enhance the outcomes. Results add to our understanding of how students learn about, and potentially change their behaviors relating to, effective learning strategies. Email: Jennifer A McCabe, jennifer.mccabe@goucher.edu

6:00-7:30 PM (3211)

The Impact of "Good" and "Bad" Lecturing on Students' Judgments of Learning and Learning Performance. NAYANTARA KURPAD, University of Massachusetts Lowell, KELLY T. SUTHERLAND and MIKO M. WILFORD, University of Massachusetts Lowell (Sponsored by Lisa Geraci) - The current study provided a continuation of work from Carpenter, Wilford, Kornell, and Mullaney (2013), who found that students report higher judgments of learning (JOLs) after viewing a fluent instructor (i.e., good speaker) versus a disfluent instructor (i.e., poor speaker). Comparatively, actual learning performance did not differ as a result of lecture fluency. Building on Carpenter et al. (2013), the present study examined whether feedback could mitigate overconfident JOLs in a subsequent trial for participants in the fluent lecturer condition. A 2 (fluent, disfluent) by 2 (feedback, no feedback) between-subjects design was employed. Participants' actual learning performances and JOLs were significantly higher after viewing the fluent lecturer. Additionally, these same participants rated the fluent lecturer significantly higher in instructor-evaluation questions such as organization, preparedness, knowledgeability, and effectiveness. Feedback on actual learning performance after the first knowledge test did not have an effect on participants' JOLs for the second video. These results highlight the need to tailor feedback in order to improve calibration.

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6:00-7:30 PM (3212)

"Learning to Learn": A Course in Metacognition for First-Year College Students. ELISABETH J. PLORAN, Hofstra University, AMY A. OVERMAN and J. TODD LEE, Elon University, AMY M. MASNICK and KRISTIN WEINGARTNER, Hofstra University (Presented by Elisabeth Ploran) - Many professors note the challenges first-year college students encounter in adapting to college-level learning. Within cognitive psychology, the benefits of understanding and applying adequate metacognitive strategies is well-known. Here, research teams from two universities created a template for a "Learning to Learn" course to teach first-year students the science of how learning works and how to effectively apply learning strategies to achieve their academic goals. This course can be implemented across campuses and student populations and is designed to help students transfer their strategy use to any major or discipline. For example, the capstone project requires students to actively apply self-selected strategies towards another of their current courses and to reflect on, and report, how the "Learning to Learn" course impacts their academic success. In addition to presenting the design of the course, assessment and feedback from students related to metacognitive abilities and growth mindset will be discussed.

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6:00-7:30 PM (3213)

A Latent Profile Analysis of Student Restudy Decisions. ALISON ROBEY, *University of Maryland*, *College Park* – Do all learners make the same restudy decisions, or is there heterogeneity within the population? The present study combines three previously published datasets and uses latent profile analysis to determine if subpopulations of learners can be identified that make different restudy decisions. Based on multiple fit indices and cross-validation, a 4-cluster model was selected. Two clusters of learners differentiate items based on their current knowledge focusing on either known or unknown items for restudy, whereas two clusters do not distinguish between known and unknown items and instead choose to restudy almost all or almost none of the items, regardless of whether they were retrieved correctly. Additional auxiliary variable analyses revealed that learners who chose to focus their restudy on unknown information have better restudy decision accuracy than the other clusters. Implications for future exploration of student restudy decisions and the need to explore heterogeneity are discussed.

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6:00-7:30 PM (3214)

The Impact of Lecture Fluency on Notetaking. PAIGE E. NORTHERN and SARAH K. TAUBER, Texas Christian University, KYLE J. ST. HILAIRE and SHANA K. CARPENTER, Iowa State University (Sponsored by Sarah Tauber) - Research shows that lecture fluency (the ease with which a lecture is delivered) can impact students' perceptions of learning and evaluations of instructors but has minimal direct impact on students' actual learning. However, lecture fluency could indirectly impact students' learning through self-regulated behaviors such as notetaking. To investigate this, students took notes while watching a fluent lecture (e.g., eye-contact, confident speaking, appropriate body language) or disfluent lecture (e.g., reading from notes, less confident, hunched over a podium), after which they provided a judgement of learning (JOL), rated the instructor, and completed a multiple-choice test over the lecture material. Lecture fluency had a larger impact on students' JOLs and instructor ratings than on students' notes or test performance. Thus, lecture fluency influenced students' subjective experiences with minimal indirect or direct impact on actual learning.

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6:00-7:30 PM (3215)

The Memory Benefits of Deadly Diseases: Increased Source Memory for Objects Touched by Individuals with Ebola. MATTHEW R. GRETZ, KENDAL A. SMITH, NICHOLAS P. MAXWELL, and MARK J. HUFF, University of Southern Mississippi (Presented by Matthew Gretz) - Threats of contamination from an infectious disease have been shown to activate a disease-avoidance system, termed the Behavioral Immune System (BIS). The BIS can facilitate cognitive processes in order to detect and retain sources of infectious disease. The current study examines how recall and source recognition are affected by Ebola, a significant life-threatening and highly contagious disease. Participants studied four videos depicting actors touching a subset of items in common household scenes. Prior to viewing each video, participants were informed that the actor was either diagnosed with Ebola, a highly contagious and deadly disease, Cancer, a non-contagious disease, or was healthy. Results showed that participants exhibited greater source recognition for items touched by actors infected with

Ebola, but not when the actor had Cancer or was healthy. The current study provides further evidence regarding sourcememory benefits for objects associated with an infectious disease.

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6:00-7:30 PM (3216)

Changes in Student Use of Learning Strategies During a Rigorous Academic Experience. EMILY EEN, CRISTINA D. ZEPEDA, and ANDREW C. BUTLER, Washington University in St. Louis (Sponsored by Andrew Butler) - Previous work has shown that students use sub-optimal learning strategies and are sometimes unaware of which learning strategies are effective. We investigated the learning strategies of 2,082 high school students in dual-enrollment courses via surveys administered at both the beginning and end of the courses. We examined the strategies students reported using, whether they reported changing their strategies after the course, and whether any reported change in strategy use was related to change in their effectiveness ratings for nine strategies (e.g., retrieval practice, highlighting). Students reported using a mix of effective and ineffective strategies, and most reported using just one or two types of strategies. After the course, over 50% of students reported that they had changed their learning strategies. Of the students who changed their strategies, some specifically reported incorporating new types of strategies, but many indicated they had increased the frequency or efficacy of strategies they already used.

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6:00-7:30 PM (3217)

Learning from Feedback in College Courses: Student Practices, Beliefs, and Preferences. CRISTINA D. ZEPEDA, Washington University in St. Louis, FRANCESCA R. ORTEGREN, University of Southern Indiana, ANDREW C. BUTLER, Washington University in St. Louis - In educational settings, students receive different types of task-level feedback depending on the type of assignment or assessment. In a largescale survey, we examined students' experiences with receiving feedback in college courses, their perceptions of the feedback, and the motivational and regulatory strategies they used to learn from it. Over 400 students answered questions about their experiences receiving feedback for different types of assignments and assessments (e.g., exams, quizzes, writing assignments, lab reports, projects) for a specific course. They also answered questions about their general beliefs and preferences regarding feedback. On average, students reported that they received feedback on three types of assignments or assessments with the most common being exams. They reported using a variety of regulatory and motivational strategies to learn from feedback. Most students believed that the utility of feedback declined over time and preferred immediate over delayed feedback. The results from this study provide novel insights into student beliefs and preferences regarding feedback, and how they relate to normative practices in learning from feedback. Email: Cristina D. Zepeda, cdzepeda@wustl.edu

Unbelieving the Believable: Considerations in the Updating of Psychology Misconceptions. RENÉE DECARO and AYANNA K. THOMAS, Tufts University (Sponsored by Ayanna Thomas) - Misconceptions related to psychology are difficult to correct. Further, psychology misconceptions are held by people of all ages, but no research has addressed how to correct these in older people. The present research investigated updating psychology misconceptions as a function of confidence, following immediate refutation and explanation. In the first session, young and older adults took a TRUE/FALSE test of 50 psychology misconceptions and made immediate confidence judgments. Following confidence ratings, participants were shown corrective feedback and an explanation for the correct answer. A retest occurred one week later. Results demonstrated that young and older adults varied in the misconceptions they endorsed. At the first test, participants demonstrated poor metacognitive accuracy. Despite this, older adults updated misconceptions, and did so regardless of initially held confidence. Results are discussed in terms of the effects of age on the correction of misconceptions and knowledge updating. Email: Renée DeCaro, renee.decaro@tufts.edu

6:00-7:30 PM (3219)

Teacher, Teach Thyself: Expectations of Teaching on Learning from Text. TRICIA A. GUERRERO, University of Illinois at Chicago, JENNIFER WILEY, University of Illinois at Chicago - Some research has suggested that solely engaging in preparation to teach, without actually teaching, can lead to benefits in learning (Bargh & Schul, 1980; Fiorella & Mayer, 2013; Nestojko et al., 2014). The current study tested the effects of expecting to teach on learning from a complex expository science text. Expecting to teach compared to just expecting to take a test affected the quality of processing during study, the amount of information encoded, and led to small improvements in performance on a final delayed inference test. Although these effects were small, future work examining other stages of teaching, specifically actually teaching a group of students, and answering students' questions, might clarify how varying stages of teaching could add to this benefit.

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6:00-7:30 PM (3220)

To Interleave or Not to Interleave: How Mixed-Topic Studying Affects Learning of Unrelated Educational Texts. KENDRICK CANIZALES, STEVEN C. PAN, JORDAN A. BRABEC, ROBERT A. BJORK, and ELIZABETH LIGON BJORK, *University of California, Los Angeles* – College students commonly take courses on a variety of topics simultaneously. We investigated whether the benefits of interleaving demonstrated for inductive/categorical learning would also occur when studying unrelated course topics. In three experiments, using college-level texts addressing three diverse topics (physiology, weather, and technology), participants first studied and then, 48-hours later, completed a final exam. In keeping with previous findings, we expected interleaved study of the topics, rather than studying one-at-a-time (i.e., blocked practice), would generate higher final performance. Experiment 1, however,

revealed no difference between the effectiveness of interleaved versus blocked practice. Dividing each topic into subunits that were blocked or interleaved (Experiment 2) or using more related passages (Experiment 3) also did not produce significant differences between blocked and interleaved study. Overall, our findings suggest that interleaving neither boosts, nor hinders, learning a set of unrelated text materials. Whether that generalization remains true with materials that are similar and/or confusable is under investigation.

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6:00-7:30 PM (3221)

Value-Based Directed Forgetting. YI-PEI LO, University of Illinois at Urbana-Champaign, LILI SAHAKYAN, University of Illinois at Urbana-Champaign (Sponsored by Lili Sahakyan) - In value-based learning, different values are assigned to the material to direct learning strategies during encoding. Despite their extensive use, more research was done with positive values than negative values. We conducted four studies to examine the effects of values in item-method directed forgetting (DF) paradigm. Participants studied object-scene pairs, which were assigned the following value points (-10 vs. 0 vs. +10). They were told that negative values would subtract, whereas positive values would add to the total score, and that they should strategically maximize total points. In some studies, we controlled the encoding strategy instruction or left it open to participants (Experiments 1 and 2). In others, we included an explicit Remember/Forget instruction and varied the magnitude of negative values (Experiments 3 and 4). Combining negative values, positive values, and 0-point values in the same design allowed assessing DF impairment of Forget-cued items and the enhancement of Remember-cued items in comparison with 0-point items, making the latter an ideal baseline for assessing DF effect. The results have implications for underlying mechanisms of strategic regulation of memory and intentional forgetting.

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6:00-7:30 PM (3222)

Hypercorrection in 10,000 Real-World Learners. MATTHEW JENSEN HAYS, AARON RICHARD GLICK, and CHARLES J. SMITH, Amplifire - Feedback provided after an incorrect response can correct a learner's misconception. Intuitively, a misconception held with high confidence should be more difficult to correct than one with low confidence. On the contrary, Butterfield and Metcalfe (2001) found that highconfidence errors were hypercorrected; corrections to them were recalled better than corrections to low-confidence errors. In small laboratory studies (e.g., Butler, Fazio, & Marsh, 2011), the hypercorrection effect has been demonstrated to last at least seven days. We present forgetting-curve data from 13,525 real-world learners that demonstrate the hypercorrection effect persists for over six weeks. We also demonstrate the substantial impact of the testing effect on both the shape of forgetting curves and the magnitude of the hypercorrection effect. We discuss the implications for adaptive educational technology and cognitive modeling.

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6:00-7:30 PM (3223)

Correcting Neuromyths: A Comparison of Interventions. MARCUS LITHANDER, University of Massachusetts Lowell, LISA GERACI and MELTEM KARACA, University of Massachusetts Lowell - Neuromyths are common misconceptions about the brain and how people learn (e.g., students learn best when they receive information in their preferred learning style). We investigated whether beliefs in neuromyths can be corrected using different types of material, including in-text refutations with different levels of source credibility (Rich, Van Loon, Dunlosky, & Zaragoza, 2017; Swire & Ecker, 2018). Participants took an initial test regarding their beliefs in various statements about brain function and learning, half of which were true and half of which were false (the neuromyths). Type of correction was manipulated between subjects using four conditions: (1) feedback only, (2) feedback and refutation, including an explanation with citation, (3) feedback and refutation, including an explanation with citation plus image, and (4) no feedback (control). Participants' belief in neuromyths following the corrections or no correction was measured immediately and after a one-week delay. Results are discussed in terms of designing interventions to correct erroneous information in educational settings and elsewhere. Email: Marcus Lithander, Marcus_Lithander@uml.edu

6:00-7:30 PM (3224)

When Aloud Becomes Silent: Disrupting the Influence of Distinctiveness in the Production Effect. YICHU ZHOU and COLIN M. MACLEOD, University of Waterloo (Sponsored by Colin MacLeod) - The production effect is the robust finding that words read aloud are remembered better than words read silently. The distinctiveness account hypothesizes that the production effect results primarily from the aloud words standing out against the background of the silent words, allowing people to use a "Do I remember saying this word out loud?" heuristic at test. In two experiments, we attempted to disrupt this distinctiveness by inserting distractor words-all read aloud or all read silently- between successive aloud and silent target words. Within-subject, the production effect for the target words was smaller when the distractor words were read aloud as opposed to silently. Between-subjects, there was also a production effect for the distractor words (all aloud better remembered than all silent). Including the distractor words essentially altered the relative frequency of the aloud and silent words in the target set thereby also altering distinctiveness. Email: Yichu (Craig) Zhou, craig.zhou@uwaterloo.ca

6:00-7:30 PM (3225)

That's So Meta: A Meta-Analysis of Relative Metacomprehension Accuracy. THOMAS D. GRIFFIN, University of Illinois at Chicago, MARTA K. MIELICKI, Kent State University, JENNIFER WILEY, University of Illinois at Chicago – Thirty-five years ago, Maki and Berry (1984) and Glenberg and Epstein (1985) published the first papers on metacomprehension, reporting the accuracy of readers' metacognitive monitoring judgments about their comprehension of complex expository texts. The current metaanalysis summarizes the subsequent studies that have employed the same basic judgment paradigm in order to identify variations in methodology that influence baseline relative accuracy levels. Studies using only a single test item per text reported lower (near zero) accuracy levels, as did studies where texts were on the same topic or within the same domain. The use of test items requiring inferences rather than just memoryfor-details resulted in lower accuracy, especially among gradeschool samples. Finally, postdictions were more accurate than predictions, and this effect was larger for inference tests. The results are discussed in relation to both methodological recommendations and implications for existing theories of judgment processes and constraints on relative accuracy. Email: Thomas D.Griffin, tgriffin@uic.edu

Poster Session IV Saturday Noon Room 517 B Viewing 11:00 AM-1:30 PM, Author Present 12:00-1:30 PM

POSTER SESSION IV

12:00-1:30 PM (4001)

The Cerebellum's Role in Distributing Attention During Motor-Cognitive Dual-Tasking: Evidence from Patients. ERIKA CHARLOTTE SABINA KÜNSTLER, Jena University Hospital - Beyond coordinating movement, the cerebellum supports executive functions such as motor-cognitive dualtasking. The precise role of the cerebellum is, however, unclear; does it integrate individual task networks into one distinct dual-task network? To test this, 26 cerebellar infarct patients and 26 healthy controls performed a visual task and a motor task. Patients showed no residual fine motor deficits. Both groups showed similar visual processing rates and visual short-term memory storage capacities in both single- and dual-task conditions and performed comparably in the motor task in the single-task condition. However, patients were less accurate in the motor task in the dual-task condition. Resting state fMRI analyses indicated a correlation between the motor dual-task costs and the connectivity between the cerebellum and the ventral attention network in healthy controls, but not in patients. These findings suggest that the cerebellum plays a decisive role in coordinating cognitive resources across tasks during motor-cognitive dual-tasking.

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12:00-1:30 PM (4002)

Are Frequent Multitaskers Better at Multitasking? Examining the Relationship Between Self-Reported Media Multitasking and Dual-Task Performance. SANDRA J. THOMSON and CLARA SANTACRUZ, St. Thomas University - Media multitasking is increasingly common in everyday life and appears to be associated with negative effects on attentional control. Yet to date only a few studies have investigated the relationship between media multitasking and dual-task performance. Here, we examine the association between media multitasking and two tasks that measure capacity limitations in central processing mechanisms: the attentional blink task and the psychological refractory period (PRP) paradigm. We show that the magnitude of the attentional blink and the PRP effect are not related to self-reported levels of media multitasking. However, heavy media multitaskers demonstrate a stronger backward crosstalk effect in the PRP paradigm, which implies a greater degree of parallel response selection relative to light media multitaskers. These findings suggest that frequent media multitasking in everyday life does not reduce central processing limitations in dual task performance but may relate to individual differences in task shielding and attentional control. Email: Sandra J. Thomson, sthomson@stu.ca

Conceptual Compatibility Between Stimuli and Action Effects Affects Dual-Task Costs. JONATHAN **SCHACHERER** ELIOT HAZELTINE, and University of Iowa (Sponsored by Eliot Hazeltine) -Dual-task costs (DTCs) are reduced when there is modality compatibility-that is the tasks' stimulus modalities match aspects of the responses' action effects. However, it is possible that DTCs are reduced in such cases because stimuli conceptually correspond to the action effects. To address this, we used a dual-task procedure in which responses produced experimentally-induced action effects, and we assessed how the conceptual relationship between stimuli and induced action effects within or between tasks affected DTCs, while keeping SR pairings identical across groups. When stimuli conceptually corresponded to action effects within a task (e.g., Task 1:tree stimulus, tree effect; Task 2:pig stimulus, pig effect), DTCs were smaller than when stimuli corresponded to action effects across tasks (e.g., Task 1:tree stimulus, pig effect; Task 2:pig stimulus, tree effect). We also included conditions in which both modality- and conceptually-compatible codes were present across tasks. DTCs were near-identical to when there was conceptual correspondence across tasks. These results suggest that DTC reductions may stem from the conceptual relatedness between stimuli and action effects, which may play a role in modality compatibility effects

12:00-1:30 PM (4003)

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12:00-1:30 PM (4004)

An Evidence Accumulation Model of Task Priority for Dual-Tasks. SPENCER C. CASTRO, University of Utah, ANDREW HEATHCOTE, University of Tasmania, DAVID L. STRAYER, University of Utah (Sponsored by David Strayer) Researchers currently utilize detection-response tasks (DRTs) and evidence accumulation modeling to quantify the cognitive workload aspect of dual-task cost in applied settings like driving. However, task priority's effect on the DRT and driving has not been thoroughly investigated. The current study investigates the relationship between three levels of task priority (e.g., DRT emphasis, equal emphasis, and steering emphasis instructions) and parameters of response bias, the rate of information processing, and failures to respond with: 1) DRT response time and steering error in a driving-like steering task and 2) two simultaneous two-alternative forcedchoice tasks. The experiments demonstrate a linear tradeoff in performance across the three conditions, and the response bias parameter accounts for a majority of the effect. However, model comparisons select a model with a rate parameter as well, indicating the involvement of a cognitive bottleneck in voluntary attention allocation. These findings establish how evidence accumulation parameters can map onto theoretical Saturday Noon

constructs of cognitive control and limited attentional resources for both driver distraction and more general interactions of task priority and attentional effort.

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12:00-1:30 PM (4005)

The Eyes Don't Lie: Pupil Dilation Indices of Cognitive Effort While Listening in Noise. STEFANIA CERISANO, McMaster University, JEFF CRUKLEY, Starkey Hearing Technologies Canada, HANNAH M. SONG, KARIN R. HUMPHREYS, and SCOTT WATTER, McMaster University (Sponsored by Scott Watter) - The cognitive demands of listening in noise and divided attention can be measured by behavioural tasks, as well as pupillary response. Normal-hearing undergraduates completed a dual-task experiment in which they repeated words presented in background noise, in either single-task (listening alone) or dual-task (n-back secondary task) conditions. Absolute pupil dilation showed the expected effects: greater dilation in the presence of background noise, as well as in dualtask conditions. Pupillary response showed distinct effects of both background noise and secondary task that reached similar peak dilation after presentation of the target word. Effects were less clear in behavioural measures, where task demands affected some aspects of performance and appeared to trade off with others. Pupil dilation was sensitive to the effects that behavioural tasks were not always able to measure, and demonstrated the cognitive effort of listening in noise, with or without a secondary task. These findings support the usefulness of pupil dilation as a measure of real-world cognitive effort when listening in noise, and demonstrate the degree to which hearing deficits impose substantial cognitive demands. Email: Stefania Cerisano, cerisas@mcmaster.ca

12:00-1:30 PM (4006)

Task-Switching Differentially Affects Vswm Components in Divided Attention. RUIZHI DAI, AYANNA K. THOMAS, and HOLLY A. TAYLOR, Tufts University, IRA E. HYMAN, Western Washington University - Using a divided attention paradigm, we explored how task-switching and task-prioritization affected visuo-spatial working memory (VSWM). Participants engaged in two concurrent tasks (VSWM and tracking). The VSWM task involved learning object identities and locations in a 5x5 grid. The *tracking task* involved either tracking a moving dot or evaluating semantic associations of a changing word. Priority of task, either tracking or VSWM task, was established through instructions and was manipulated between participants or within participants. Either in different groups or in different blocks participants were told to prioritize one task over the other. Overall, we found that the word-tracking task was more disruptive than the dot-tracking task, and participants' VSWM was better when prioritized. More importantly, task-switching may differentially impact object and location memory. When participants had the same priority throughout (betweenparticipant), object memory was more disrupted than location memory; however, when prioritization switched within-test, location memory was more impaired.

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12:00-1:30 PM (4007)

Using a Commercial Off-The-Shelf Brain Stimulation Device to Modulate Cognitive Control Under Motor Demands. NATHAN WARD, VICTORIA KUSZTOS, THOMAS WOOTEN, ELIZABETH MARFEO, and EDUARDO FONTES, Tufts University, TAD BRUNYE and ERIKA HUSSEY, CABCS - Recent work on cognitive-motor dualtasking indicates that introducing a cognitive task negatively impacts motor performance. Transcranial direct current stimulation (tDCS) of certain brain regions has been shown to mitigate these decrements. The present work aims to test if the complementary effects hold true: Does tDCS also modulate the impact of motor demands on cognitive function? We used the Halo Sport, a commercially available neurostimulation device, to bilaterally target motor areas with 2mA of tDCS in 60 participants (Sham: N=30; Active: N=30) while they completed four cognitive tasks (Stroop, Task Switching, N-Back, Speed of Processing) on both firm and foam surfaces to introduce high and low motor demands, respectively. We did not observe effects of brain stimulation on any of the cognitive tasks regardless of motor demand, suggesting that cognitive-motor interactions may be limited to cognitive demands influencing motor performance, but not the other way around. Email: Nathan Ward, nathan.ward@tufts.edu

12:00-1:30 PM (4008)

Individual Differences in the Resumption of an Interrupted Dynamic Task: Exploring the Role of Interruption Length. KATHERINE LABONTÉ, JOANIE LAMIRANDE, ALESSANDRO POZZI, LYSANDRE PROVOST, and FRANÇOIS VACHON, Université Laval (Sponsored by François Vachon) - Because dynamic tasks are actively evolving, the cognitive processes involved in their resumption following an interruption likely differ from those involved in static task resumption, especially as interruption duration increases. Yet, little is known about the mechanisms underlying interruption recovery in dynamic settings. The current study examines the association between 1) accuracy and response time following 5-s, 15-s, or 30-s interrupting tasks occurring in a dynamic multiple object tracking primary task and 2) four cognitive abilities considered as potentially relevant to recovery. These abilities, namely working memory capacity, visual search capacity, motion prediction ability, and cognitive flexibility, were measured using four secondary tasks. Canonical correlations performed in each interruption condition revealed that greater visual search capacity and cognitive flexibility were associated with better recovery regardless of the interruptions' length. However, working memory capacity and motion prediction ability seemed to play a role in dynamic task resumption following short interruptions only.

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12:00-1:30 PM (4009)

Individual Differences in the Simon Effect Are Influenced by Factors Other Than Executive Control. LAURYN MUIR, ALEXIS GUYTON, CIARRA GILMORE, and COREY N. WHITE, *Missouri Western State University* (Sponsored by Corey White) – The Simon Task is commonly used to assess individual differences in executive function. The standard analysis involves computing a Simon Effect for each participant, calculated as the difference in RTs between congruent and incongruent conditions. However recent work suggests RT difference scores like the Simon Effect can be contaminated by extraneous factors like response caution. To investigate whether this issue extends to the Simon Effect, we looked at 1) the magnitude of the Simon Effect under speed vs. accuracy instructions, and 2) the magnitude of the Simon Effect as a function of a participant's overall response speed. In a regular version of the Simon Task, we found a significant negative correlation between overall response speed and the magnitude of the Simon Effect. Consistent with this result, we found in a speed/accuracy version of the task that the Simon Effect is significantly smaller when participants emphasize accuracy over speed. Together, these results suggest that the Simon Effect is not a pure measure of executive function because it is affected by extraneous factors like response caution. Implications are discussed about using this task to measure individual or group differences in executive function.

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12:00-1:30 PM (4010)

Cognitive Training and Susceptibility to Visual Illusions in the Context of Field Dependence/Independence. Working Memory Training Reduce Ponzo Effect. HANNA BEDNAREK, University of Social Sciences and Humanities, JAROSŁAW ORZECHOWSKI, Jagiellonian University, MAGDELENA PRZEDNICZEK, University of Social Sciences and Humanities, JUSTYNA OLSZEWSKA, University of Wisconsin Oshkosh, JAKUB NIEWIAROWSKI, University of Social Sciences and Humanities - In the current study we aimed to test specific cognitive training tasks: perceptual/sensory functions, exogenous attention, and WM and their influence on resistance to visual illusions that are categorized as orientation (Poggendorff, Zöllner, Ponzo) and metric (Ebbinghaus and Müller-Lyer). Moreover, we attempted to verify whether cognitive trainings are more beneficial for field dependent or field independent subjects. 250 participants were divided into two homogenous subgroups (FD/FI) prior to their assignment to either a perception task group, an attention task group, a working memory task group or a non-active, control group. All training groups received a 3 weeks of cognitive adaptive training with 18 sessions of 30 minutes a day whereas the control group participated in the pretest and posttest at the same test/retest intervals. Results showed that in general field dependent participants appeared to be more prone to visual illusions as compared to field-independent. In addition, it was demonstrated that a WM training reduced susceptibility to the Ponzo illusion among field-dependent participants. The results are discussed within the far and near transfer approach. Email: Hanna Bednarek, Hanna.Bednarek@swps.edu.pl

12:00-1:30 PM (4011)

Testing Between No Factors and One Factor: The Case of Cognitive Control. AAKRITI KUMAR, *University of California, Irvine*, JEFFREY N. ROUDER, *University of California, Irvine* (Sponsored by Jeffrey Rouder) – Inhibition or cognitive control is often considered arising from a common, unified, latent factor. Yet, the evidence for this factor has been elusive as correlations between tasks have been marginal and resulting factors typically load well only on a single task. How can psychologists formally test whether data come from a onefactor model or a "no factor model," where performance on tasks across people are independent? To answer this question we combine a Bayesian probabilistic principal-component model (Tipping and Bishop, 1999) with a spike-and-slab prior over factor scores. With this approach, the independence model occurs when all factor scores are simultaneously zero (in the spike); the factor model occurs otherwise. By computing the posterior probability that factor scores are in the spike, it is possible to assess whether the independence model outperforms a model with factors. Applications to extant data are provided. Email: Aakriti Kumar, aakritk@uci.edu

12:00-1:30 PM (4012)

Holistic (Gestalt-Like) or Compositional Cognitive Action Representation? The Role of Dimensional Overlap. LYNN HUESTEGGE, Würzburg University, ALEKS PIECZYKOLAN and IRING KOCH, RWTH Aachen University - Compositional theories of behavior are ubiquitous in cognitive sciences. For example, multitasking theories typically assume that dualtask processing is composed of two combined single-task processing streams, plus some additional mechanism to account for performance costs (e.g., prolongation/interruption of task processing stages, or altered activation/inhibition dynamics etc.). Here, the compositional assumption is put to a test by having participants switch between single- and dualaction demands. In a set of experiments, we neither observed consistent partial repetition benefits nor costs. Instead, dual action demands appeared to be represented similar to a third, holistic action demand, unrelated to its two components. We interpret these observations by proposing a Gestalt view of action control. However, when the two actions no longer shared a common (spatial) dimension, partial repetition benefits emerged, indexing compositional action representation. The results highlight the role of dimensional overlap between actions as a precondition for forming holistic action representations. Email: Lynn Huestegge, lynn.huestegge@uni-wuerzburg.de

12:00-1:30 PM (4013)

Uncovering the Attentional Boost Effect with Words: An Exploration of Experimental Parameters. LISA LORENTZ, MITCHELL R.P. LAPOINTE, TAMARA M. ROSNER, and BRUCE MILLIKEN, *McMaster University* (Sponsored by David Shore) – Memory for items presented at study simultaneously with a simple detection task target is often better than memory for items presented simultaneously with a detection task distractor. This finding is known as the attentional boost effect (ABE). Initial work on the ABE used pictures as the to-beremembered items. Later work successfully observed an ABE with words. The present study focused on measuring the ABE with words and explored a host of parametric variations across a series of experiments. Although we successfully replicated the findings of a seminal study on the ABE with words (Mulligan, Spataro, & Picklesimer, 2014), we observed a significantly

smaller ABE—or no ABE at all—with slight changes of parameters. The results of the present study will be examined in light of our understanding of the cognitive mechanisms underlying the ABE.

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12:00-1:30 PM (4014)

Switching Between Languages Versus Tasks: Which Benefits More from Preparation? BRONTË GRAHAM and AURELIU LAVRIC, University of Exeter (Sponsored by Aureliu Lavric) - A substantial literature relates task-set control and language selection in bilinguals. We asked a basic question: is preparation equally effective in the two domains? Bilingual participants switched between naming pictures in one language or another, or (in a separate session) between the tasks of naming and categorization. The trials used for comparing task and language switching were identical in all respects - task (picture naming), stimuli, responses, trial structure - except one: the language or task specified by the (shape) cue presented before the picture. Preparation for a task switch was more effective: increasing the cue-stimulus interval from 50ms to 800ms reduced the RT task "switch cost" by ~63%, and the language switch cost only by ~24%. We also investigated the associations between the stimulus and the language (or task) where it was last encountered. An influential account of the source of "switch costs" postulates that it primarily arises from greater stimulusinduced associative retrieval of the irrelevant task-set on switch trials than on repeat trials. Our results do not support this account: associative history influenced performance - but no more for switches than repetitions.

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12:00-1:30 PM (4015)

Is There an Immediate Effect of Varying Bilingual Language Contexts on Cognitive Control Strategies? MICHELLE BRUNI and CHRISTINE CHIARELLO, University of California, Riverside - The Adaptive Control Hypothesis (Green, 2013) suggests that variant patterns of bilingual language use implicate different demands on bilinguals' executive functions. The present study investigated whether there are immediate effects on cognitive control which depend on different contexts of bilingual language use (single language use vs dual language use with frequent code shifts). All bilingual participants completed an AX-CPT pretest (Braver, 2007), then one group (Mixed) read randomly intermixed Spanish-English code switched sentences aloud and another group (Blocked) read one block each of unilingual English and Spanish sentences. A control group watched a 30-minute silent video between the pre- and post-test. Next, all completed an AX-CPT post-test. We predicted that both experimental groups would exhibit a proactive control shift on the post-test, with the Mixed group showing a larger shift. There appeared to be no group differences on the post-test AX-CPT task, suggesting that neither language context produced an immediate change in cognitive control strategy.

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12:00-1:30 PM (4016)

Using Machine Learning to Assess Whether Bilingual Experience Predicts Second Language Outcomes and Proactive Executive Control Performance. JASON W. GULLIFER and DEBRA TITONE, McGill University - Science explains existing data and predicts new data. However, Yarkoni and Westfall (2017) argue the former is more traditionally emphasized, leading to model overfitting, complex theories, and heterogeneous outcomes across studies. A potential remedy is a common machine learning approach, cross-validation, which tests whether existing models can predict unmodeled data. Here, we contrast traditional and cross-validation approaches to address a contentious question, i.e., whether bilingual experience relates to executive control capacity. We focus on proactive control as measured by the AX continuous performance task (AX-CPT) for a large sample of young adult bilinguals (N = 459). As proof of concept, we first show that bilingual experience explains and predicts self-report second language ability measures. We then show that bilingual experience does no better in predicting AX-CPT performance than experimental condition alone, even though traditional models yield significant effects of bilingual experience. We conclude by discussing potential interpretations of this disparity. Email: Jason W. Gullifer, jason.gullifer@mail.mcgill.ca

12:00-1:30 PM (4017)

Bilingualism Leads to Cognitive Reserve in Older Adults. JOHN AE. ANDERSON, Centre for Addiction and Mental Health, JOHN G. GRUNDY, Iowa State University, RYAN M. BARKER, University of Toronto, ELLEN BIALYSTOK, York University - The rise in Alzheimer's cases is a major health concern. Drugs are largely ineffective at delaying progression, but lifestyle factors, "cognitive reserve", are more successful at holding back dementia symptoms despite continuing neural atrophy. Bilingualism is one such cognitive reserve factor and delays the onset of dementia symptoms by approximately 4 years. While previous research examined cognitive reserve in the context of clinical cases, we tested whether effects of bilingualism were detectable at an earlier stage in healthy aging. Older bilingual and monolingual adults participated in a memory study (N-Back and Item recognition) while being scanned with fMRI. Item recognition was similar across groups, but bilinguals were faster than monolinguals on the 2-Back. Crucially, VBM revealed that bilinguals had less grey matter volume than monolinguals and fMRI showed that bilinguals recruited different regions while performing the tasks. Results are discussed in terms of implications for cognitive aging and the role of bilingualism in cognitive reserve. Email: Ellen Bialystok, ellenb@yorku.ca

12:00-1:30 PM (4018)

Conceptual Representations of Culturally-Loaded Animals in Chinese-English Bilinguals. XUAN PAN and DEBRA JARED, *Western University* (Sponsored by Debra Jared) – Dong et al. (2015) proposed that when an individual learns a word in L2, they link the features from the translation in L1 to that word, and as they become proficient in L2, bilinguals drop L1-specific features and add L2-specific features to their

L2 conceptual representations. The present study tested this proposal with Chinese-English bilinguals using an English semantic priming task with ERP. Primes were animal names (owl), and targets were either related in English (WISE), in Chinese (MISFORTUNE), or were unrelated. For English monolinguals, a priming effect was observed in the N400 only for pairs related in English (owl-WISE). For bilinguals, a N400 priming effect was observed for pairs related in Chinese (owl-MISFORTUNE), indicating that the bilinguals link L2 words with L1 features. No N400 priming effect was found for pairs related in English (owl-WISE), suggesting that the bilinguals did not yet have connections between L2 words and L2-specific features.

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12:00-1:30 PM (4019)

Social Power and Approach Behaviour in English vs. Mandarin Speakers. HUILAN YANG, J. NICK REID, and ALBERT N. KATZ, Western University (Sponsored by Albert Katz) - Research has found that social power [defined here as the capacity to affect others through providing or withholding resources, or administering punishments (Keltner, Gruenfeld, and Anderson, 2003)] is associated with approach behavior (e.g., moving towards a desirable, in this case, powerful object). However, this association, when observed, has not been explicitly explored across different languages and cultures. Here we recruited both English and Mandarin speakers and had them identify words associated with social power/powerlessness (e.g., "boss"; "intern") as either "powerful" or "powerless" as quickly as possible. For congruent trials, pressing the button closest to the computer screen (moving towards the word) identified the word as "powerful." For non-congruent trials, the responses were reversed. We found a significant interaction between congruency and language such that Chinese-speaking participants, but not English-speaking Canadian participants, were faster on congruent compared to non-congruent trials. Explanations for this linguistic-cultural difference are suggested. Email: J. Nick Reid, jreid256@uwo.ca

12:00-1:30 PM (4020)

Novel Word Learning with Definitions and Visualizations: An ERP Study. DAISY LEI, YUSHUANG LIU, and JANET G. VAN HELL, Pennsylvania State University (Sponsored by Natasha Tokowicz) - The complementary learning systems theory proposes two neural systems for word learning (Davis & Gaskell, 2009). Novel words are encoded as episodic memory traces in the hippocampal system. After a period of consolidation (e.g., overnight sleep), these memory traces gradually become lexicalized and achieve stable and longer-term neocortical representations. To study whether the lexicalization of novel words can be expedited by integrated learning of verbal definitions and visualizations (relative to verbal definitions learning only, Bakker et al., 2015), monolinguals were trained on two lists of novel words on Day 1 and Day 2. Both lists were tested using an EEG recorded semantic priming task on Day 2 and Day 8. Lexicalization of the novel words was studied by examining the N400 and LPC time windows. Day 2 ERP data show that, only for novel words learned on Day 1 but not on Day

2, novel words preceded by semantically related primes elicited a more positive LPC response than novel words preceded by unrelated primes. Day 8 data indicate a similar semantic priming effect for Day 1 and Day 2 novel words. This suggests that only novel words learned the day before and not the day of testing demonstrate lexicalization and consolidation. Email: Daisy Lei, dul261@psu.edu

12:00-1:30 PM (4021)

Individual Differences in Bilingual Performance During an N-Back Task: An Erp Study. CASSANDRA MORRISON, FAROOQ KAMAL, and VANESSA TALER, University of Ottawa (Sponsored by Aimee Surprenant) - Research has suggested a bilingual advantage in working memory, presumably due to bilinguals' need to inhibit one language while using the other and to shift between two languages. These results are still controversial: the bilingual population is diverse, leading to difficulty in controlling factors that may influence intra-group variability. In this study, we investigated age of acquisition of second language (L2), years of education in L2, and amount of L2 use on working memory performance and electrophysiological measures. Participants completed a n-back task while reaction time, accuracy, and electroencephalography were recorded. Results revealed that amount of L2 use accounted for 38-48% of the accuracy variance within bilinguals. The ERP results revealed that years of education in L2 accounted for 15-30% of the variance within bilinguals. These findings provide evidence that future research needs to control for individual differences within bilinguals.

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12:00-1:30 PM (4022)

The Relationship Between Inhibitory Control and Language Proficiency in L3 Learners. NORIKO HOSHINO, Tsuda University, MONTSERRAT SANZ, Kobe City University of Foreign Studies - When learners speak in a second language (L2), their first language (L1) is also activated and they need to inhibit the activation of the L1 to make an utterance in the L2 (e.g., Linck et al., 2009). The present study examined the degree of inhibition of the L1 and L2 when learners spoke in a third language (L3). Japanese speakers who learned English as an L2 and Spanish as an L3 were divided into two groups: learners naming pictures in L1 Japanese and L3 Spanish and those naming pictures in L2 English and L3 Spanish. In one condition (blocked naming), the participants first named a set of pictures in one language and then named another set in the other language. The order of language of naming was counterbalanced across participants. In the other condition (mixed naming), they named a new set of pictures in the language cued by the color of the picture frame. All the participants completed two blocks of blocked naming (one in each language), followed by a block of mixed naming. It was hypothesized that learners would inhibit L1 Japanese more strongly than L2 English when they spoke L3 Spanish. Results will be analyzed and implications for the models of inhibitory control in bilingual production will be discussed.

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12:00-1:30 PM (4023)

Behavioral and Neural Signatures of Language Learning at the Earliest Stages. ELEONORA ROSSI and MEGAN NAKAMURA, University of Florida - This study investigates if a novel semi-intensive language training induces early behavioral and neural changes. In addition, we ask how linguistic immersion affects these early measures. To that goal, two groups of native English speakers learned Dutch via a commercial software for a period of 10 consecutive days (1hr/day). Critically, the immersed group was located in The Netherlands, and the nonimmersed in the US. Participants (n=21) completed a linguistic and cognitive battery pre and post training, and a semantic categorization task while EEG was recorded. Preliminary results reveal that both groups successfully learned Dutch vocabulary, suggesting rapid encoding of new linguistic information. The EEG data demonstrates a significant reduction of the N400 effect size at a post-test, reflecting ease of lexical access in long term memory. Taken together, the data offer evidence that both neural and behavioral signatures are visible in the earliest stages of novel language learning.

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12:00-1:30 PM (4024)

The Domino Effect: Speaking Spanish Increases Ambiguity of English Spelling-To-Sound Mappings in Heritage Speakers. DALIA GARCIA, JASON WONG, SIERRA CHEUNG, and JUDITH F. KROLL, University of California, Riverside, MONA ROXANA BOTEZATU, University of Missouri - The dynamic nature of the language system enables bilinguals to transfer reading skills and strategies cross-linguistically. The ability to read a language with a shallow alphabetic orthography has been reported to increase lexical mediation when bilinguals read the deep alphabetic orthography of English, their native language (Nosarti et al., 2009). We investigated whether the ability to speak (but not formally read) Spanish, a language with a shallow alphabetic orthography, impacts English reading. English-dominant heritage speakers of Spanish and English monolinguals named English words that varied in spelling-sound regularity/consistency and lexical frequency. Higher lexical frequency and regular-consistent spelling-sound mappings facilitated word naming latencies. Spanish proficiency predicted English phonemic decoding ability. Critically, higher English phonemic decoding ability was associated with a smaller regularity-consistency effect in English word naming in heritage speakers but did not predict the regularity-consistency effect in monolinguals. Results suggest that Spanish speaking proficiency increases ambiguity of English spelling-to-sound mappings.

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12:00-1:30 PM (4025)

Local and Global Control Operate on Switch and Non-Switch Trials: Perro Inhibits Dog and English. DANIEL KLEINMAN, *Haskins Laboratories*, TAMAR H. GOLLAN, *University of California, San Diego* – When bilinguals repeatedly name pictures while cued to switch languages, they are sometimes forced to override existing stimulus-response bindings, as when naming a picture of a DOG in English that was most recently named in Spanish (a "binding-inconsistent" trial). Is this difficult only because of competition at the lexical (local) level, or also because binding-inconsistent names activate the wrong language (global level control)? If global, the extra activation of Spanish must be inhibited before "dog" can be produced - making it even harder to switch to Spanish, but easier to stay in English, on the *next* trial. We tested this hypothesis using data from 416 Spanish-English bilinguals who repeatedly named 9 pictures with cues to switch languages. On switch trials, RTs were slower when the previous trial was binding-inconsistent, but on non-switch trials, RTs were faster when the previous trial was binding-inconsistent (a cross-over interaction between previous-trial binding consistency and current trial type, p < .00001). This result demonstrates how highly automatic and consistent use of BOTH local and global language control mechanisms enable bilinguals to both switch and not switch languages at will.

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12:00-1:30 PM (4026)

Not Keeping Another Language in Mind: How Bilinguals Represent Sentence Structures of Two Languages. DANBI AHN, TAMAR H. GOLLAN, and VICTOR S. FERREIRA, University of California, San Diego (Sponsored by Victor Ferreira) - People represent the structures of sentences in the languages that they know. When the two languages have different word orders, how does the knowledge of one language influence the production of the other? Here, we examined whether bilinguals access sentence structures from both languages even when speaking in only one. To do this, we compared English monolinguals and Korean-dominant Korean-English bilinguals producing noun phrases in English ("the cat below the chair"), which has different word orders in Korean (for the same event, Korean word order is [chair] [below] [cat]). We examined when speakers plan each noun in a noun phrase, using extended picture-word interference with either the distractor word dog (semantically related to "cat") or desk (semantically related to "chair"). We observed that English monolinguals plan each noun immediately before saying it. Results from bilingual production suggested that when speaking English, Korean-English bilinguals show interference effects in a way that resembles English monolinguals' pattern. This suggests that when describing an event that has different word orders in their different languages, bilinguals access only the sentence structure of the language they're using. Email: Danbi Ahn, yoahn@ucsd.edu

12:00-1:30 PM (4027)

Bilingual Language Control While Mixing and Switching. MARIA FERNANDA GAVINO and MATTHEW GOLDRICK, *Northwestern University* (Sponsored by Matthew Goldrick) – Bilinguals select which language they want to use through language control mechanisms like inhibition. The degree of inhibition changes depending on whether bilinguals are using one language (single context) or both languages (mixed context). Mixed contexts include stay (following word is in same language) and switch (following word is in different language) contexts. Language selection becomes more difficult when bilinguals are using both of their languages (particularly when switching), requiring greater use of inhibition. Increased language selection difficulty slow down retrieval and increase accentedness. Yet, since no study has looked at both reaction times and accentedness, it is unclear if there is a single or there are multiple inhibitory mechanisms driving these effects. In this project participants name pictures in single, switch, and stay contexts. If there is only one inhibitory mechanism, retrieval and accentedness effects should show similar sensitivity to the difficulty of language selection.

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12:00-1:30 PM (4028)

Different Sources of Facilitation and Interference in Bilingual Language Production: Effects of AoA, Proficiency, and Translation Knowledge on L2 Lexical Access. ANDREA TAKAHESU TABORI, University of California, Irvine, JENNIE PYERS, Wellesley College - The frequency lag account attributes bilinguals' less efficient production to frequency of language use, while the *competition for selection* attributes it to non-target language competition. We tested these accounts by examining the relationship between L2 lexical access and Age of Acquisition (AoA), vocabulary size and L1 translation knowledge. English monolinguals (n=30), early simultaneous (n=28) and early sequential (n=22) Spanish-English bilinguals named pictures of low-frequency words in English (L2). Data were coded for correct retrievals and Tips-of-the-Tongue (TOTs). Categorical comparisons replicated previous findings that monolinguals had fewer TOTs and more correct retrievals than the bilinguals. Early simultaneous bilinguals had fewer TOTs and more correct retrievals than early sequential bilinguals. Continuous analyses suggested that AoA and proficiency are the best predictors of L2 lexical access when retrieval is efficient. However, when retrieval is more effortful, bilinguals are prone to L1 facilitation or inhibition depending on their language proficiency. Email: Andrea Takahesu Tabori, Ataka013@ucr.edu

12:00-1:30 PM (4029)

Language-Independent Talker Similarity Space Captured by Dynamic Time Warping. JORDAN R. HOSIER and ANN R. BRADLOW, Northwestern University (Sponsored by Ann R. Bradlow) - Talker-specific characteristics combine with, rather than are overwhelmed by, language-specific influences in bilingual speech production, such that a significant portion of variation in L2 speech can be accounted for by variation in L1 speech (e.g. Bradlow, Blasingame and Lee, 2018). In an attempt to identify features that underlie this language-independent talker-specificity, this work used a holistic measure of acoustic signal similarity, Dynamic Time Warping (DTW), to represent a group of Mandarin-English bilingual talkers (n=14) in L1 and L2 multi-dimensional similarity spaces. Significant correlations were found between the arrangements of the 14 talkers in the L1 and L2 similarity spaces-evidence that this method successfully captures talker characteristics independent of language spoken. Furthermore, in each space, there were significant correlations between one of the two principal

dimensions and both intelligibility and speaking rate. This work serves as a proof of concept for an accent space based on a holistic measure of talker similarity. Future work will use this method to develop a talker accent space which can be used to evaluate similarity-based predictions of accent adaptation and generalization patterns.

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12:00-1:30 PM (4030)

Cognates Produce Both Facilitation and Interference. EVE E. HIGBY and JUDITH F. KROLL, University of California, Riverside - Cognates are translations that have similar form and meaning across languages. Bilinguals retrieve cognates from memory more quickly than non-cognates. However, they name pictures more slowly immediately after naming a cognate than a non-cognate (Broersma et al., 2016), and the size of the cognate facilitation effect is smaller (Acheson et al., 2012). The source of these cognate effects is not well understood. In this study, we asked whether cognate effects arise during speech articulation or during retrieval from memory. Proficient Spanish-English bilinguals (n = 19) saw line drawings and named either the color or the object name. After color-naming for cognates, they were faster for cognate object-naming but slower for non-cognate object-naming compared to naming after non-cognate color naming. Thus, post-cognate effects were observed even when bilinguals did not produce the cognate name, suggesting that they implicitly retrieved the cognate name and that the effects arise at a pre-articulatory stage.

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12:00-1:30 PM (4031)

Task Conflict in the Reverse Stroop Task with Manual Responses. YUKI ASHITAKA, West Japane Railway Company, HIROYUKI SHIMADA, Kobe University - Previous studies on task conflict in the Stroop task have demonstrated differences in the shape of response-time distribution between congruent and neutral conditions. Furthermore, distributional differences not only of the Stroop task but also of the reverse Stroop task have been reported in task switching procedures. However, other procedures that induce task conflict in the reverse Stroop task than task switching procedures remain unclear. Word reading is normally more dominant than color naming unless it is used in the reverse Stroop task. The present study conducted three procedures in the reverse Stroop task using manual responses. Results indicated significant reverse Stroop effects without response conflict in two procedures. Importantly, the results across the three procedures did not show differences in the shape of response-time distributions in the congruent conditions, although there were differences in mean response times. Task conflict in the reverse Stroop task is discussed. Email: Yuki Ashitaka, yuuki-ashitaka02@westjr.co.jp

12:00-1:30 PM (4032)

Factor Analysis of Cognitive Control. HUANGQI JIANG and BROOKE N. MACNAMARA, *Case Western Reserve University* (Sponsored by Brooke Macnamara) – The Dual Mechanisms of Cognitive Control (DMC) was proposed to describe two distinct and coexisting mechanisms for cognitive control: proactive control and reactive control (Braver, 2012; Braver, Gray, & Burgess, 2007). The DMC framework assumes that proactive control and reactive control are independent. Though some evidence has been found to support the independence of the DMC mechanisms, this idea has not been investigated using latent variable techniques. In this study, we examined four tasks that have been proposed to test the DMC. Factor analysis on eight markers (one proactive control marker and one reactive control marker from each task) was conducted to verify the factor components of these markers. Although results indicated that the two markers were dissociable in some tasks, the markers did not load on two independent components in the factor analysis. Further, reliability analyses suggested that the tasks typically associated with measuring the DMC do not produce reliable markers.

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12:00-1:30 PM (4033)

Performance Feedback Promotes Learned Proactive but Not Reactive Adaptation of Conflict-Control. CHRISTINA BEJJANI, SOPHIE TAN, and TOBIAS EGNER, Duke University (Sponsored by Tobias Egner) - Cognitive control refers to the use of internal goals to guide how we process stimuli, and control can be applied proactively (in anticipation of a stimulus) or reactively (once that stimulus has been presented). The application of control can be guided by memory; for instance, people typically learn to adjust their level of attentional selectivity to changing task statistics, such as different frequencies of hard and easy trials in the Stroop task. This type of "controllearning" is highly adaptive, but its boundary conditions are currently not well understood. In the present study, we assessed how performance feedback shapes control-learning in the context of item-specific (reactive control, Experiment 1) and list-wide (proactive control, Experiment 2) proportion of congruency manipulations. Performance feedback did not alter the modulation of the Stroop effect by item-specific cueing but did enhance the modulation of the Stroop effect by a listwide context. Performance feedback thus selectively promoted proactive but not reactive adaptation of cognitive control, which has important implications for experimental designs, potential psychiatric treatment, and theoretical accounts of the mechanisms underlying control-learning.

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12:00-1:30 PM (4034)

What About the Truth? Inhibition in Dishonest Responding. ANNA FOERSTER, WILFRIED KUNDE, and ROLAND PFISTER, *University of Würzburg* (Sponsored by Roland Pfister) – Theoretical models assume that a dishonest response is planned in light of an initial activation of the honest response. Current accounts do not specify the fate of the honest response in the process, and we studied whether honest response activation either passively lingers in the system and decays, or whether it is subject to active inhibition during dishonest responding. We tested this hypothesis in a virtual treasure hunt where participants classified four landmarks honestly and dishonestly by keypresses. A cue indicated whenever a dishonest response was required as a means to mislead spying treasure hunters. In pairs of successive dishonest trials, we scrutinized whether participants preferred or avoided the dishonest response option that had been the honest alternative in the preceding dishonest trial. Participants avoided this response option, supporting the assumption that dishonest responding entails active inhibition of the honest response. An open question for further examinations is whether this inhibition process targets conceptual and/or motor representations.

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12:00-1:30 PM (4035)

Memory-Driven Control: One-Shot Learning of Item-Specific Stimulus-Control Associations. PETER S. WHITEHEAD, Duke University, CHRISTINA U. PFEUFFER, Albert-Ludwigs-Universität Freiburg, TOBIAS EGNER, Duke University (Sponsored by Tobias Egner) - Item-specific stimulus-response (S-R) associations can be created through one-time task-set execution. These S-R associations are made up of two components: stimulus-action (S-A; e.g., "appleright") and stimulus-classification (S-C; e.g. "apple-small") associations. Upon subsequent stimulus presentations these associations are automatically retrieved. Separately, prior work has also indicated that repeated pairing of a particular stimulus and specific cognitive control demands (like the need to switch task-set) can form stimulus-control associations. However, it is not known whether such stimulus-control associations are acquired through slow, incremental learning or, like S-A and S-C associations, can be formed through a single stimuluscontrol pairing. Here, across four task-switching experiments, we demonstrate for the first time that an item-specific stimuluscontrol association can be formed based on a single exposure. This stimulus-control association is dependent on the repetition of S-C mappings. These results provide strong evidence for an episodic memory contribution to the regulation of cognitive control.

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12:00-1:30 PM (4036)

The Effect of Cue Salience on Cognitive Control in Young and Older Adults. CASSANDRA SKROTZKI, CHARLES STONE, and LIXIA YANG, Ryerson University (Sponsored by Lixia Yang) - Cognitive control is the ability to regulate one's thoughts and actions to achieve a goal (Diamond, 2013). The Dual Mechanisms of Control framework (Braver, 2012) proposes two types of cognitive control: proactive (cuefocused) and reactive (probe-focused). Research shows that cognitive control strategies shift from predominantly proactive to reactive from young adulthood into older age (Braver et al., 2009; Paxton et al., 2008). In a modified AX-Continuous Performance Task (AX-CPT; Cohen, Barch, Carter, & Servan-Schreiber, 1999), our previous work showed that older adults engaged in proactive control similar to young adults in a dichotomous face-cues letter-probe AX-CPT task. The current study is a follow-up examining the role of dichotomous cues and cue-probe distinction in promoting older adults' proactive control. In experiment 1, dichotomous letter cues (A and Z) were employed to test whether reducing the number of cues to two could improve older adults' proactive control. In

experiment 2, colour-coded categorical letter-cues (red vs. blue) were employed to investigate the effect of cue-probe distinction. Both manipulations are expected to improve older adults' proactive control to be comparable to young adults. Email: Cassandra Skrotzki, cskrotzki@ryerson.ca

12:00-1:30 PM (4037)

The Temporal and Spatial Dynamics of the Congruency Sequence Effect. CHAE EUN LIM, Korea University, HANSOL RHEEM, Arizona State University, YANG SEOK CHO, Korea University - The present study examined the dynamics of cognitive control underlying the confound-minimized congruency sequence effect (CSE) with various movement measures, using a mouse-tracking technique. Horizontal and vertical Simon tasks consisting of different stimulus and response sets were presented alternately, which avoided potential confounds of the repetition priming and contingency learning effects. The confound-minimized CSE was evident in various movement measures, like movement time, area under curve, and velocity, but it was not significant in initiation time. These results suggest that an inaccurately activated response was more efficiently corrected when preceded by incongruent trials than congruent trials. Furthermore, the analyses on the velocity and trajectory angle across time demonstrated the temporal and spatial dynamics of two competing responses that evolve and converge depending on the control triggered by previous trial's congruency. These findings provide a new insight on when and how the cognitive control mechanism operates throughout information processing.

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12:00-1:30 PM (4038)

The Listwide Proportion Switch Effect Is Driven by Taskand Item-Level Learning. AUDREY LIU and TOBIAS EGNER, Duke University (Sponsored by Tobias Egner) - Switch costs tend to decrease as the proportion of switches within blocks increases, suggesting that participants become more flexible or switch ready when they switch between tasks more frequently (Monsell & Mizon, 2006). The precise source and scope of this list-wide proportion switch effect (LWPSE) are currently unknown. We conducted a series of four experiments to elucidate the LWPSE. Exp 1 replicated Monsell & Mizon's (2006) basic finding. Using a 3 instead of 2 tasks paradigm, Exp 2 demonstrated that the LWPSE is preserved when participants do not know the specific alternate task they will switch to. Exp 3 introduced an unbiased "transfer task," which was always presented equally often as switch and repeat trials, intermixed with two biased tasks which drove overall high or low switch proportions. The LWPSE was only found for the biased tasks, suggesting that the contextual modulation of switch costs is task and/or item-specific. Exp 4 used switch-proportion biased versus unbiased stimuli and produced switch cost modulation in both stimulus sets. These results document that the LWPSE is mediated by both task-level and item-level learning of switch readiness.

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12:00-1:30 PM (4039)

Conflict Adaption Between Cognition and Emotion in Proactive Control and Reactive Control. JINI TAE, George Washington University, YOONHYOUNG LEE, Yeungnam University, CHRISTINE AN and MYEONG-HO SOHN, George Washington University - Although it is intuitively compelling that emotion has effects on cognitive ability, it is not clear exactly how emotion and cognition interact with each other. The current study examined whether detection of conflict in one domain can lead to conflict adaptation in another domain. In Experiment 1, participants performed emotion Stroop and color Stroop tasks in a task switching paradigm, in which conflict detection results in reactive mode of control. The results showed that conflict adaptation was significant within a task but not between tasks. In Experiment 2, the cross-task conflict adaptation was still not significant when two tasks (emotion Stroop and gender Stroop) shared the same stimulus. Next, to examine the cross-task conflict adaptation in the proactive mode of control, we manipulated the proportion congruence of one task (emotion Stroop in Experiment 3 and gender Stroop in Experiment 4), while keeping the proportion congruence of the other task equal. In both experiments, the proportion congruence of one task modulated the conflict effect of the other task. These results suggest that emotional conflict and cognitive conflict may be exchangeable only when the mode of control is proactive.

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12:00-1:30 PM (4040)

Bottom-Up Influences on Voluntary Task Switching in Different Reward Contexts. VANESSA JURCZYK, University of Regensburg, KERSTIN FRÖBER, University of Regensburg, GESINE DREISBACH, University of Regensburg - In humans, voluntary task switching is susceptible to bottom-up influences like a switch of the relevant stimulus identity (Mayr & Bell, 2006). A recent study with ants (Czaczkes, Koch, Fröber, & Dreisbach, 2018) has shown that even irrelevant cue changes increase switching behavior, but only if they were presented within a high-reward context. To investigate whether in humans a reward context also increases switching behavior in response to meaningless cue changes, we conducted two voluntary task switching studies. On each trial, participants chose between two tasks preceded by one of two different color cues. Reward prospect was manipulated between blocks (Experiment 1: no vs. high reward; Experiment 2: low vs. high reward). In both experiments, the cue change did not modulate the voluntary switch rate. However, the voluntary switch rate was significantly lower in high-reward blocks as compared to no-reward or low-reward blocks. This suggests that bottom-up influences on deliberate task switching in humans are indeed limited to task-relevant information. Moreover, the finding of a decreased voluntary switch rate within a high-reward context further supports the claim that unchanged high reward promotes cognitive stability.

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12:00-1:30 PM (4041)

Does the Subjective Value of Cognitive Effort Modulate Voluntary Task Choice? GESINE DREISBACH and VANESSA JURCZYK, Regensburg University - Human beings tend to avoid effort, if a less effortful option is equally rewarding. However, and in sharp contrast to this claim, we repeatedly found that (a subset of) participants deliberately choose the more difficult of two tasks in a voluntary task switching paradigm even though avoidance of the difficult task was allowed (Jurczyk, Fröber & Dreisbach, 2018). One potential reason may be that participants differ with respect to their subjective value of cognitive effort. To investigate this question, participants (N=100) first went through several blocks of voluntary task choices between an easy and a difficult task. After that they worked through an effort discounting paradigm (Westbrook, Kester & Braver, 2013) that required participants to make a series of iterative choices between re-doing a difficult or an easy task block for a variable amount of money until the individual indifference point was reached. As predicted, we found a significant correlation between participants' individual effort costs and the voluntary choice rate for the difficult task: The lower the subjective effort costs, the higher the VSR to the difficult task. Results will be discussed with respect to current theories on effort-based decision making.

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12:00-1:30 PM (4042)

Directed Forgetting of Same-Race and Cross-Race Faces. LILI SAHAKYAN, University of Illinois at Urbana-Champaign, HUIYU DING and JONATHON WHITLOCK, University of Illinois at Urbana-Champaign - It is well established that we remember same-race faces better than faces of other races, known as the cross-race effect. However, it is unclear whether the race of the face might play a role when the goal is to forget rather than to remember information. To the best of our knowledge, this is the first examination that combined a directed forgetting manipulation with the cross-race manipulation. The central goal was to investigate if there is differential ability to forget same-race and cross-race faces when attempting to forget intentionally. Across two studies, participants studied a mixture of Caucasian and Asian faces, each followed by the forget or remember instruction (i.e., item-method directed forgetting procedure). Testing involved a recognition test that combined a yes/no judgment with a four-point confidence scale (sure old, maybe old, maybe new, sure new). Experiment 1 involved 49 participants, comprised of college students from Mainland China and the United States. Experiment 2 involved 68 US students and it differed from Experiment 1 by having a shorter study list.

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12:00-1:30 PM (4043)

Can We Intentionally Forget Relational Information? JONATHON WHITLOCK, University of Illinois at Urbana-Champaign, YI-CHIEH CHIU and LILI SAHAKYAN, University of Illinois at Urbana-Champaign (Sponsored by Jarrod Lewis-Peacock) – Historically directed forgetting studies have focused on impaired memory for Forget-cued items, and relatively little is known about what happens to memory for relational information, which involves associations between the elements that constitute a memory episode. In a series of studies, we used an established relational memory paradigm, which has been well-integrated with eye-movement monitoring and established eve-movements as a sensitive marker of relational memory. Participants studied object-scene pairs using instructions that either emphasized or deemphasized relational encoding, and were subsequently tested by having to select the object that was paired with the test scene amongst the choice of two lures. Eye-movements were monitored at test. Behavioral accuracy disassociated item impairment and relational memory impairment, confirming that directed forgetting impacts relational memory. Eye-movement behavior also revealed patterns that distinguished between accidental forgetting and intentional forgetting, confirming relational memory impairment in directed forgetting. Email: Lili Sahakyan, lsahaky@illinois.edu

12:00-1:30 PM (4044)

Hierarchical Control of Sequential and Cue-Based Actions: Transition vs. Overhead Costs. MELISSA E. MOSS, ALI R. BYERS, MIN ZHANG, and ULRICH MAYR, University of Oregon (Sponsored by Ulrich Mayr) - Complex planning and problem solving often requires the cognitive system to utilize multi-level hierarchical control structures. However, we know relatively little about the exact source of processing limitations when navigating such structures. Specifically, processing costs could arise either from specific points at which higher level representations need to be updated (transition costs) or from overall cognitive load of maintaining the control structure (overhead costs). Furthermore, movement through control structures can either be contingent on external cues, or on the sequential position within the larger structure. We manipulated the number of hierarchical levels (1-4) across three different task domains, in the context of both serial-order and cue-based rule structures. As expected, we found that RTs increased as a function of levels. More importantly, across both contexts, we found robust transition costs and overhead costs. However, overhead costs were larger in the serial-order context, while transition costs were larger in the cue-based context, suggesting a greater opportunity for outsourcing of structure maintenance demands to the environment when control is cue-contingent. Email: Melissa E. Moss, mmoss2@uoregon.edu

12:00-1:30 PM (4045)

Action-Compatibility Effect Evident in Both Younger and Older Adults. EMMA NISSENBAUM, University of Hartford, CLAUDIA REPETTO, Università Cattolica del Sacro Cuore, JENNIFER PALAFOX, LAUREN ROMANO, and MATTHEW C. COSTELLO, University of Hartford – The action-compatibility effect (ACE) has become a well-studied example of embodiment in cognition and perception. In the task, participants are asked to judge whether a sentence makes semantic sense or is nonsensical. The sentences are manipulated so that they semantically imply actions that move toward or away from the participant, and the response keys are positioned to induce action responses that move either toward or away from the participant. The ACE effect is the response time decrease that occurs when the semantic directionality and response directionality match one another. Although ACE has been confirmed in younger adults, to date it has never been explored in older adults. There is reason to doubt that ACE would exist with older adults, given their general decline in sensorimotor coupling. However, reading ability and crystalized intelligence are generally preserved in older adulthood. The current project explores whether age-related differences exist in ACE. Initial analyses have found ACE in both younger and older adults, indicating an age-related preservation of motorreading coupling. These findings are discussed with reference to the broader topic of embodiment, aging, and compensation. Email: Matthew C. Costello, mcostello@hartford.edu

12:00-1:30 PM (4046)

Handedness Effects on Posture and Inhibitory Control. ALYSSA MASON and STEPHEN D. CHRISTMAN, University of Toledo (Sponsored by Stephen D. Christman) - Previous research shows that performance on tasks requiring inhibitory control, such as the Stroop task, is enhanced when participants complete the task standing rather than sitting. Standing increases activation of the right hemisphere of the brain and executive function/inhibitory control. Handedness differences that may moderate this effect have not yet been investigated. It has been shown that inconsistent-handed (ICH) individuals, who have larger corpora callosa than consistent-handed (CH) individuals, have increased ability to transfer and integrate information between the hemispheres of the brain. We predicted that there would be larger differences in performance between sitting and standing conditions depending on degree of hand preference. A 2(Handedness) x 2(Posture) x 3(Trial Type) ANOVA was conducted on reaction time (RT). On incongruent trials, RT of ICH was decreased when standing compared to sitting, while there was no effect of posture on CHs' performance. Perhaps standing is more beneficial for ICHs because increased activation of the right hemisphere decreases the activation of the left (literate) hemisphere, making it easier to name the color instead of the word that is presented. Email: Alyssa Mason, alyssa.chapman@rockets.utoledo.edu

12:00-1:30 PM (4047)

The Effects of Product Orientation and Interest in Product Category on Purchase Intention for a Really New Product. SAYO ISEKI, SHINJI KITAGAMI, and JUN KAWAGUCHI, Nagoya University (Sponsored by Jun Kawaguchi) - Although firms spend billions of dollars developing and marketing them, new products face persistently high failure rates. Specifically, consumers tend to underestimate really new products (RNPs) that enable consumers to do things they have never been able to do before through technologically groundbreaking departures from traditional categories. A lack of episodic memories or semantic memories about RNPs suppresses mental simulation of using RNPs, which increases consumers' evaluation and purchase intention. This study examined whether embodied rather than memory-focused mental simulation could increase purchase intention for an RNP. Embodied mental simulation

was manipulated depending on whether the product orientation matches the dominant hand. Results revealed that only people with originally low interest in the product category are more likely to intend to purchase when the product orientation matches the dominant hand. This suggests that it is effective to promote such embodied mental simulation toward consumers with poor interest in RNPs.

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12:00-1:30 PM (4048)

The Influence of Posture on Emotional Reasoning and Attentional Bias. MARIE-ÈVE GAGNON, CLAUDINE GÉLINAS, and ISABELLE BLANCHETTE, Université du Québec à Trois-Rivières (Sponsored by Isabelle Blanchette) - Embodied cognition theory suggests that the actions and perceptions of the body, including facial expressions and posture, can impact cognitive processes and the experience of emotions. The goal of the present study was to explore the role of posture in cognitive tasks that includes emotional stimuli. Participants were asked to pose a slouched or a straight posture (within-subject) during a reasoning task and a Stroop task. Both tasks included neutral and emotional stimuli. As predicted, the proportion of logically correct responses on the reasoning task was lower when the content was emotional compared to neutral, but this effect was weakened when participants were in a slouched posture. In the Stroop task, the slouched posture reduced the attentional bias towards negative stimuli and inverted the bias towards positive stimuli. These results support the embodied cognition theory and are a first demonstration of the influence of posture on a high-level cognitive process. Email: Marie-Ève Gagnon, marie-eve.gagnon@uqtr.ca

12:00-1:30 PM (4049)

Investigating the Effects of a Physics Misconception on the Perception of Physical Motion. QUENTIN KING-SHEPARD, ERIC KUO, and TIM NOKES-MALACH, University of Pittsburgh (Sponsored by Tim Nokes-Malach) - Knowledge formed from experiences and observations can often be in conflict with scientific concepts (e.g., misconceptions). While there is prior work that examines the relation between perceptual (embodied) and declarative knowledge, less research has investigated the relation between the two in physics misconceptions. We investigated whether priming existing incorrect conceptions about physical motion can cause misperceptions of physical motion in a video. In this study, we compared individuals who made declarative predictions (prediction group) about balancing with those who did not (control group), subsequently examining perception of balancing in a video. Individuals with incorrect predictions were less accurate in reporting correct physical motion when compared to the control group. Two follow-up studies investigated how (i) prompt wording and (ii) ambiguity in the video motion may affect perceptual/memory processing. We discuss the implications of these results for theories of physics misconceptions and knowledge representation.

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12:00-1:30 PM (4050)

One Against All: The Special Case of the Auditory Modality in Visual Word Processing. MILICA POPOVIĆ STIJAČIĆ, Laboratory for Experimental Psychology Novi Sad, DUŠICA FILIPOVIĆ ĐURĐEVIĆ, Faculty of Philosophy, University of Belgrade (Sponsored by Laurie Feldman) - According to the embodiment perspective, conceptual representations include simulations of perceptual experience. Recently, the role of measures that incorporate the diversity of perceptual experience (number of sensory modalities through which a concept can be experienced - NoM) or the intensity of perceptual experience (vector length - VL; Lynott & Connell, 2013; Filipović Đurđević et al., 2016) have been recognized, in addition to the more traditional modality-specific measures of concreteness. Although both measures influence processing over and above concreteness, their collinearity makes it unclear whether they reflect two sources of perceptual richness. In order to test for the unique contribution of NoM as a measure of multimodality in Serbian nouns, we manipulated NoM while keeping VL and multiple control variables constant. An increase in NoM had no effect on visual lexical decision over and above VL, except in those with auditory modality. The possibility of auditorily experiencing an object prolonged the processing of the word denoting it. We discuss our findings in the light of interactions between the perceptual and conceptual system.

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12:00-1:30 PM (4051)

Semantic Processing of Words and Sentences in Perihand Space. STEPHEN J. AGAUAS and LAURA E. THOMAS, North Dakota State University - A variety of research shows observers experience visual biases when viewing objects within versus outside of perihand space (e.g., Goodhew et al., 2015). Although most work has focused on biases associated with performance in classic visual cognition paradigms, there is some evidence that semantic processing may also change when observers read material within perihand space (Davoli et al., 2010). To further investigate this possibility, we asked readers to categorize single words using the Calgary Semantic Decision Task (Experiment 1) and read sentences containing metaphors (Experiment 2) while their hands were either near the display or positioned in their laps. Across these two experiments, hand position had no significant influence on either processing time or eye movement behavior, suggesting biases in perihand space may be fragile during reading tasks. A pre-registered replication of Davoli et al. (2010) is underway to further investigate the influence of hand position on semantic processing. Email: Stephen J. Agauas, stephen.agauas@ndsu.edu

12:00-1:30 PM (4052)

Motor Stereotypes Provide a Non-Embodied Account for Action-Compatibility Effects. MORGAN TESKEY, DANIEL N. BUB, and MICHAEL E.J. MASSON, *University of Victoria* (Sponsored by Michael Masson) – Embodied accounts of language processing propose that meaning is constructed with the assistance of relevant sensory-motor representations. In favor of the embodied view, Zwaan and Taylor (2006) reported evidence of an online reading-speed advantage when the directional component of a manual-rotation task was compatible with the direction of rotation implied by an action sentence, compared to when they were incompatible. This action-compatibility effect was ascribed to the simulation of a motor program developed through one's experiences with an object. We propose an alternative account of this effect, based on the concept of a motor stereotype: the idea that a verb, isolated from sentence content, is stereotypically associated with a particular direction of rotation. We will demonstrate a case in which a motor stereotype is not compatible with everyday experiences and establish that a motor stereotype account of action-compatibly effects more parsimoniously accounts for conflicting results in the literature than does an embodied framework.

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12:00-1:30 PM (4053)

New Evidence of a Sensory-Based Functional Knowledge. STEVE BUENO, ALIX SEIGNEURIC, and HAKIMA MEGHERBI, Université Paris 13 Sorbonne Paris Cité - The very well-known priming paradigm has rarely been used to put the embodied cognition theory to the test. However, Myung, Blumstein & Sedivy (2006) have shown that the name of an auditorily-presented object (e.g. piano) could implicitly facilitate the recognition of the name of a semantically unrelated object on the basis of shared manipulation-features (e.g., typewriter). Nonetheless, the auditorily items presentation used by these authors fell short of efficiently addressing the question of the time-course (and potential automaticity) of this phenomenon in such a paradigm. In order to address this question, pairs of words that shared manipulation-features were selected and presented to participants who performed a primed visual lexical decision task, for which prime words were presented under three different durations (50, 100 or 250 msec). Contrasted results were obtained and are discussed in the framework of the embodied cognition theory.

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12:00-1:30 PM (4054)

YourEmbodimentWillHurtYou!ImpactofAthleticStereotype Threat on Memory Performance. JACLYNN V. SULLIVAN, Mount Mercy University, ALYSSA MASON, University of Toledo -This study examined if self-identification as an athlete or non-athlete impacted one's memory performance on a word task. Participants' athletic identity was threatened (told that their performance would suffer because of their mind/body connection), supported (told their performance would improve because of their mind/body connection), or not activated (told basic information about memory). 223 participants from a Midwestern University were asked to learn a list of Lithuanian-English word pairs and then asked recall questions. There were 143 self-identified athletes and 80 non-athletes. A one-way between subjects ANOVA revealed a statistically significant effect of presentation type on recall of word pairs for athletes $(F(2, 140) = 3.91, p < .05, \eta^2 = .052)$. Athletes in the anti-athletic condition remembered significantly less word-pairs than the other message conditions. There was no significant difference between any condition for non-athletes (F(2, 77) = .075, p > .05). Invoking an anti-athletic stereotype decreased memory performance for the athletes but not the non-athletes in our sample. Evidence suggests that stereotype threat can be invoked for less salient identities, such as level of embodiment tied to athleticism.

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12:00-1:30 PM (4055)

Family Factors of Speech Development in Urban and Rural Areas. VLADIMIR SOLONDAEV and ELENA V. KONEVA, P.G. Demidov Yaroslavl State University (Presented by Vladimir Solondaev) - The impact of macrosocial factors, e.g. the residence of preschool age children, in city vs village, on the development of speech might be of interest. The urban and rural environments differ in the possibilities for children to get developing information and in their inclusion in communication systems, so it is logical to assume that the role of family interaction under different living conditions is also different. A questionnaire by V.N. Kunitsyna and E.A. Yumkina, "Family Relations and Home", was used in the research, and according to the results of testing, processed with the help of the free statistical software package R, three groups of subjects were identified. The k-means algorithm was applied. In group 1 hospitality, interpersonal relationships, intrafamily trust got high values. The groups differ significantly in speech development, group 1 being the most prominent. This refers also to a number of specific indicators, as well as to the general (final) assessment of speech development. Hence, the pattern of family functioning is clearly related to the level of speech development of children. This relationship does not depend on their residence. The research was supported by RFBR, project 18-013-00901. Email: Elena V. Koneva, ev-kon@yandex.ru

12:00-1:30 PM (4056)

Do Gesture-Like Hand Movements Disrupt the Benefit of Gesture for Memory Even When the Motor Contexts Match? RACHEL HAGEN and RACHEL SMITH, Metropolitan State University, CAITLIN HILVERMAN, Vanderbilt University Medical Center, KIMBERLY HALVORSON, Metropolitan State University - Speakers' co-speech hand gestures can facilitate listeners' memory for speech. Previous research has implicated the listeners' motor system in this phenomenon: when participants' hands are engaged in an irrelevant motor task during encoding or retrieval, the beneficial effect of gesture on memory for speech goes away. Interestingly, when participants' hands are engaged in an irrelevant motor task at encoding and retrieval, the benefit of gesture persists. Reinstating the motor context from encoding is critical. In the present study we investigate whether the benefit of gesture will persist if the motor task resembles meaningful co-speech gestures. Participants watched videos of a speaker saying action phrases with or without gesture. They generated gesture-like movements with their hands and arms during encoding only, retrieval only, continuously, or not at all. We hypothesize that the gesture-like motor task will require similar cognitive resources as the planning and execution of gesture, preventing listeners from encoding meaning from the gestures. Even if the

motor context is reinstated at recall, beneficial effects of gesture on memory are only observed when the irrelevant task does not overload the motor system.

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12:00-1:30 PM (4057)

Investigating the Influence of Emoji on Memory for Sentences. JIA YUAN TEOH and KIMBERLY HALVORSON, Metropolitan State University, CAITLIN HILVERMAN, Vanderbilt University Medical Center - During face-to-face communication, we produce co-speech hand gestures containing iconic information that are incorporated into memory. As computer-mediated communication increases, visual access to gestures decreases. Conversely, emoji - small digital icons depicting objects, faces, etc. - are widespread. Previously, we showed that, like gesture, emoji influence memory for sentences. Participants read sentences, some contained emoji conveying additional information (e.g.,"My brother went to the gym {basketball emoji}"). Overall, participants remembered more sentences with emoji than without and in some cases the emoji was incorporated into memory for the text (e.g., "My brother went to play basketball"). We followed up on this finding with two experiments; first we collected eye gaze data for the same sentences. We hypothesized that emoji will influence gaze patterns; we also predicted longer fixations on emoji that were incorporated into memory for the text. We also replicated the initial finding with a second set of sentences with less semantic overlap. We found a similar pattern of results; participants included information from emoji when recalling text. Emoji and gesture may have similar communicative functions.

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12:00-1:30 PM (4058)

The Role of Interdependence in the Movement-Induced Self-Reference Effect. MARK A. OAKES and SERGE ONYPER, St. Lawrence University - The self-reference effect (SRE) explains why memory for items, such as words or personality traits, is increased when that information is acquired by relating it to yourself, as opposed to a stranger or object. Our research examined if the SRE can be induced by movement, as well as whether it would extend to include close others like friends and family. Participants sorted neutral personality traits by moving them toward a picture of themselves, a close other, or a stranger. We found that personality traits moved towards the self and a close other were recognized more accurately than traits moved towards a stranger. Moreover, individuals low on interdependence showed the highest accuracy in recognizing traits moved towards the self and the lowest accuracy for traits moved towards a stranger, whereas those high in interdependence showed similar accuracy rates regardless of the point of reference. These results suggest that those high on interdependence spread memory resources equally across all referents, whereas those low on interdependence prioritize the self.

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12:00-1:30 PM (4059)

Is Standing Special? Postural Differences and Their Influence on Cognitive Control. KENDRA C. SMITH, Washington University in St. Louis, RICHARD A. ABRAMS, Washington University in St .Louis - Researchers have recently reported that adopting a standing posture enhances cognitive control and reduces Stroop interference. One possible explanation for this pattern of results is that the demands associated with maintaining a standing posture facilitate participants' ability to focus attention on the relevant aspects of the task. Another possibility is that standing is special and evokes changes in cognition, including enhanced cognitive control. In the present study, participants assumed a variety of postures and completed tasks that assessed cognitive control. As found in previous research, participants showed enhanced cognitive control when standing. Importantly, the effect could not be explained by the demands associated with maintaining a posture. The results suggest that there is something unique about standing, and not postural demands in general, that enhances cognitive control. Email: Kendra C. Smith, kendrasmith@wustl.edu

12:00-1:30 PM (4060)

Testing Embodied Cognition Through Color Adaptation. JAMES R. MOGAN and KATJA WIEMER, Northern Illinois University, CHRISTOPHER A. KURBY, Grand Valley State University (Sponsored by Katja Wiemer) - Using color adaptation as a means of testing embodied cognition, 85 participants were randomly assigned to one of three color conditions: green, red, or yellow. After an initial color adaptation phase of 90 seconds, participants completed 90 trials with two alternating tasks: counting shapes on a color mask (a monochromatic screen with an average of 34 shapes in one color range) to maintain adaptation, and an edibility judgment task on words normed to refer to objects of matching, mismatching, or neutral colors relative to the adaptation color. Theories of embodied cognition predict that sensory features need to be activated during conceptual access to the items, thus color adaptation should slow response times for color-matched items. This hypothesis was supported in the green and yellow conditions, but not the red condition, partially supporting the notion that activation of sensory features (here: color) is necessary when performing semantic judgments that do not explicitly require color activation.

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12:00-1:30 PM (4061)

Action Video Game Training Produces near Transfer Only. ELIZABETH A. WIEMERS (Graduate Travel Award Recipient) and THOMAS S. REDICK, *Purdue University* (Sponsored by Thomas Redick) – Gender differences in spatial ability are of particular interest given the relationship between STEM field participation and spatial ability. Action video games, particularly first-person shooter games have been proposed to increase spatial ability and decrease the gender differences in spatial ability. The present study is an action video game intervention study with young adult female non-gamers and an active control group. This study takes into consideration the critiques of the recent training literature and employs larger samples and an active control group to investigate the possibility that action video game play could increase spatial ability. This study finds near but not far transfer to spatial ability tasks. Performance on Useful Field of View improved for the Medal of Honor group above the Ballance control group, but Mental Rotation Test and Card Rotation performance were similar across groups. Given these results, we conclude that there is little to no evidence of a general spatial ability improvement after action video game training.

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12:00-1:30 PM (4062)

The Effects of Pictures and Repeated Exposure on Susceptibility to Fake News. THOMAS J. SMELTER and DUSTIN P. CALVILLO, California State University, San Marcos (Sponsored by Dustin Calvillo) - The prevalence of the internet and social media coinciding with the decline of legacy media gatekeepers have likely contributed to the current state of propagation of "fake news": deliberately inaccurate and often biased information that is presented as accurate reporting. Within the framework of typical on-screen appearance of social media, are there certain common features - the presence of pictures and repeated exposure of headlines - that may exacerbate this phenomenon? We tested these questions with two experiments: the effect of pictures (N = 211 university students) and repeated exposure (N = 200 Mechanical Turk workers). In Experiment 1, we found that the presence of pictures increased perceived accuracy of both true and fake headlines. In Experiment 2, we found that prior exposure also increased perceived accuracy of true and fake headlines. These findings suggest that factors that lead to increased perceptual fluency - pictures and prior exposure - can increase the believability of both factual and fabricated news content. Email: Thomas J. Smelter, tjsmelter@gmail.com

12:00-1:30 PM (4063)

Vaccine Skeptics Are Less Accurate at Processing Negative Event Frequencies and Over-Estimate the Frequency of Rare Events to a Greater Extent Than Non-Skeptics. MARK S. LACOUR and TYLER DAVIS, Texas Tech University (Sponsored by Tyler Davis) - Vaccines have prevented and eradicated several deadly diseases, yet still face skepticism, conspiracy ideation, and rejection from parents. In these studies, we sought to determine how individual differences in event processing may contribute to people's susceptibility to vaccine skepticism by adapting a procedure from Lichtenstein and colleagues. For Experiment 1, we asked MTurk workers (n = 158) to estimate a large number of vital statistics (e.g., how many people die from emphysema in a normal year in the U.S.) and to answer our vaccine skepticism survey. We found that vaccine skeptics are less accurate at processing event frequencies and over-estimate frequencies of rare events. For Experiment 2 participants (n =109) were also asked to estimate non-negative event frequencies (e.g., how many CGI movies premiere in the U.S. in a normal year). The effects from Experiment 1 were replicated, but not for the non-negative events. We conclude from these results that vaccine skeptics have specific deficits in event processing for emotionally negative events.

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12:00-1:30 PM (4064)

Do Knowledge and Cognitive Reflection Protect Against Susceptibility to Fake News? DUSTIN P. CALVILLO, THOMAS J. SMELTER, POOJA PUNJABI, and ALEXIS AVINA, California State University, San Marcos - People have difficulty discerning between real and fake news headlines and certain people are particularly susceptible to believe fake news (Pennycook & Rand, 2109). In two preregistered experiments, we examined two individual difference predictors of news discernment: domain knowledge and cognitive reflection. In Experiment 1, participants rated the accuracy of science news headlines and took science knowledge and cognitive reflection tests. Participants rated fake science headlines as more accurate than real science headlines, and both cognitive reflection and science knowledge predicted science news discernment. In Experiment 2, participants rated the accuracy of political news headlines and took political knowledge and cognitive reflection tests. Participants rated real political headlines as more accurate than fake political headlines, but neither cognitive reflection nor political knowledge predicted news discernment. We did, however, find evidence for motivated reasoning with political headline judgments and this may have obscured the relationship between news discernment, political knowledge, and cognitive reflection.

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12:00-1:30 PM (4065)

Modeling Intuitive Judgments of Variability. ELIZAVETA KONOVALOVA and THORSTEN PACHUR, Max Planck Institute for Human Development - Stimulus variability plays an important function in judgment and decision-making. For example, assessment of variability is essential for assessing one's confidence, and it is an important aspect in decisions under risk, where options differ in riskiness (which is related to variability). The cognitive mechanisms underlying perceptions of variability, however, are not well understood. Existing work typically relies on variance or variance-based estimators as models of perceived variability. Yet, this approach seems unlikely to provide a psychologically plausible account of the cognitive mechanism. We developed several psychologically plausible models of intuitive perception of variability. Different strategies either rely on simple categorizations of the experienced stimuli as most similar to the minimum, the maximum, or the average or exploit people's intuitive sense of similarities among stimuli. In two experiments, we compare the performance of these models in accounting for empirical data and contrast them to normative approaches, such as variance.

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12:00-1:30 PM (4066)

Judgment Under Uncertainty: How Risk Information Influences Risk Perception in Decision-Making. YUE PAN, SAYURI HAYAKAWA, and VIORICA MARIAN, Northwestern

University (Sponsored by Viorica Marian) - Risk perception can be guided by both objective facts and subjective feelings. In our experiment, we investigated how risk information influences risk perception in medical decision-making. Participants (N = 80) read 10 hypothetical medical scenarios that included the probability of experiencing adverse effects associated with either refusing or accepting preventative treatment. Results suggest that participants were inaccurate at estimating risk even when provided with objective probabilities, such that small probabilities were overestimated, and large probabilities were underestimated. When no objective probabilities were provided, participants assumed that the risks of refusing preventative treatment were greater than that of accepting it. These consequences of providing and omitting risk information suggest that different processes are engaged in risk perception depending on the access to objective probabilities, with potential implications for how information availability can influence judgment.

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12:00-1:30 PM (4067)

Graphical Depiction of Statistical Information Improves Gambling-Related Judgments. ALEXANDER C. WALKER, MADISON STANGE, MIKE J. DIXON, DEREK J. KOEHLER, and JONATHAN A. FUGELSANG, University of Waterloo (Sponsored by Jonathan Fugelsang) - Previous studies assessing decision making in a scratch card gambling domain have demonstrated that people are often unduly biased by nondiagnostic information (i.e., unclaimed prize information). In the current study, we investigated how varying the presentation format of diagnostic gambling-related information (i.e., payback percentage) influences participants' use of this information. We hypothesized that when diagnostic information was presented in a graphical, as opposed to a numerical format, participants would be better at utilizing this information and correspondingly report more optimal scratch card preferences. Across two experiments, this hypothesis was supported. In Exp. 1 (N = 201), with payback percentage presented in a numerical format, participants displayed a non-optimal preference for scratch cards with greater numbers of unclaimed prizes and lower payback percentages. This preference was reversed in Exp. 2 (N = 201) when payback percentage was presented in a graphical format. Overall, the current study demonstrates how gambling-related judgments can be improved (and use of non-diagnostic information reduced) by simply changing the presentation format of diagnostic gambling-related information.

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12:00-1:30 PM (4068)

Modeling Judgment Errors in Naturalistic Numerical Estimation. WANLING ZOU and SUDEEP BHATIA, *University of Pennsylvania* (Sponsored by Sudeep Bhatia) – We quantitatively modeled and compared two types of errors in numerical estimation for naturalistic judgment targets: *mapping errors* and *knowledge errors. Mapping errors* occur when people make mistakes reporting their beliefs about a particular numerical quantity (e.g., by inflating small numbers), whereas knowledge errors occur when people make mistakes using their knowledge about the judgment target to form their beliefs (e.g. by overweighting or underweighting cues). We fit separate mapping and knowledge error models to predict participant estimates -- the former used non-linear mappings of correct responses to predict participant estimates, whereas the latter transformed high dimensional semantic vectors of judgment targets into participant estimates through a weight vector. In two studies involving estimates of food calories and national infant mortality rates, we found that knowledge error models predicted participant estimates with high out-of-sample accuracy rates, significantly outperforming the predictions of mapping error models. The knowledge error models were also able to identify the objects and concepts most associated with incorrect estimates, shedding light on the psychological substrates of numerical judgment.

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12:00-1:30 PM (4069)

Academic Self-Concept, Theory of Intelligence, and Overconfidence in Late Elementary School Students. VALERIE UMSCHEID and KATHLEEN M. GALOTTI, Carleton College - We examined the relationship between fifth grade students' academic self-concepts, theories of intelligence, and nonverbal intelligence. Participants (N = 127; 77 male, 50 female; 91 racial/ethnic majority, 30 racial/ethnic minority) were recruited from two local elementary schools in Northfield, MN, and completed two surveys and a subset of Raven's Standard Progressive Matrices. Male and racial/ethnic majority students had more incremental of intelligence theories than female and racial/ethnic minority students, and students attending the more affluent school had somewhat, but not significantly, more incremental theories of intelligence than those attending the less affluent school. Similarly, male students students and racial/ethnic majority had positive academic self-concepts than more Racial/ female and racial/ethnic minority students. ethnic minority female students had lower nonverbal intelligence their scores than peers. and students at the less affluent school had higher nonverbal intelligence scores than students at the more affluent school. The persistence of the achievement and opportunity gaps in schools as well as the efficacy of related interventions are discussed in light of the aforementioned findings. Email: Valerie Umscheid, umscheidv@carleton.edu

12:00-1:30 PM (4070)

Individual Differences in Predicted Duration Estimates. MARILYN BOLTZ, *Haverford College* – The planning fallacy is a bias in which people tend to underestimate the predicted duration of a given task. The present research investigated the potential influence of several individual constructs and found that temporal perspective was a significant predictor: individuals with a strong future orientation produced the greatest magnitude of underestimation bias while those with a negative past orientation displayed the greatest accuracy. These results are consistent with the temporal construal theory (Trope & Liberman, 2003) which suggests the underlying mediational mechanisms at play.

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12:00-1:30 PM (4071)

Misinformation and Persuasion: Source Judgments in Fake News Perception. KELLY KANE and JOHN G. GRUNDY, Iowa State University - Fake news is endemic online, and remains difficult to separate from real news. In two studies (N = 821) we examined the parameters that individuals use to judge the perceived veracity of news stories through varying the credibility of the message author and the message protagonist. Study 1 found that participants who viewed a news story with a less-credible author (a blogger) reported lower confidence in the story's veracity than those who viewed a morecredible source (a journalist), but the effect was moderated by protagonist credibility such that a story about a doctor produced greater belief than a story about a student. Study 2 found that ego involvement (a personal stake in the outcome) moderated source perceptions through increasing trust in lowexpertise protagonists similar to oneself but decreasing trust in high-expertise subjects dissimilar to oneself. These findings will inform fake-news interventions through highlighting the need to de-emphasize protagonist credibility when assessing news stories because of the tendency to take protagonist rather than author as an implicit "source" of news information.

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12:00-1:30 PM (4072)

Content Valence and the Illusion of Truth Effect. YOOJIN CHANG, University of North Carolina at Greensboro, PETER F. DELANEY, University of North Carolina at Greensboro (Sponsored by Peter Delaney) - Repeating statements inflates truth judgments compared to new statements: the "illusion of truth" or IoT effect. The dominant theory proposes that IoT occurs because repeated statements produce heightened fluency compared to new statements. Illusory truth judgments should therefore be made rather quickly compared to false judgments. The present study varied the information pre-exposed before making truth judgments. Repeated pre-exposure was either exact (identical to the target statement; the normal IoT), positive (confirming information about the target), neutral (irrelevant information about the target), or negative (disconfirming information about the target). Pre-exposures were repeated 0, 1, or 2 times and we collected truth-confidence judgments at reaction time. Our most critical result was that content valence and number of exposures interacted in the analysis of truthconfidence judgments. Inconsistent with a simple fluency account, pre-exposed negative content decreased or even reversed the IoT effect.

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12:00-1:30 PM (4073)

Limited Metacognitive Awareness to the Accuracy of Face-Based Trait Inference. ATSUNOBU SUZUKI, University of Tokyo, MIKA UENO, Doshisha University, KENTA ISHIKAWA, AKIHIRO KOBAYASHI, and MATIA OKUBO, Senshu University, TOSHIHARU NAKAI, Nagoya Institute of Technology - People believe, to varying degrees, that one's face tells much about his or her characters, which is termed the physiognomic belief. The present study examined whether and to what extent those reporting stronger endorsement of this belief were indeed more accurate in face-based trait inference (FBTI). Participants were asked to rate the trustworthiness of unfamiliar male individuals by seeing their face photos, as well as to complete the Physiognomic Belief Scale. Unbeknownst to the participants, the males had been pre-classified into either being cooperative or selfish according to their actual behavior in a social exchange game. Results showed that when facebased discrimination of cooperative from selfish individuals was relatively easy, the physiognomic belief significantly and positively correlated with the accuracy of face-based trustworthiness rating. When face-based discrimination was relatively difficult, however, the correlation was insignificant and negative. The findings suggest a limited metacognitive awareness to the accuracy of FBTI.

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12:00-1:30 PM (4074)

Intuitive Thinking Style Predicts Illusory Perception of a Face in Everyday Objects. YUKI MIYAZAKI, Fukuyama University - The illusory perception of a face-seeing a human face in everyday objects, such as electrical outlets-can be observed in our daily lives. The aim of this study was to determine whether rational and/or intuitive thinking styles are involved in the illusory perception of a face. We divided 24 images of everyday objects into three groups based on premeasured face-likeness scores: eight had a striking likeness to human faces, eight others showed a moderate likeness to human faces, and another eight were unlikely to be perceived as human faces. Participants (n = 598) rated perceived face-likeness in the images from 1 (does not resemble a person's face) to 100 (resembles a person's face). Next, participants responded to a scale determining individual differences in intuitive and rational thinking styles. Multivariate regression showed that the intuitive, not rational, score was a significant predictor of illusory perception of a face, regardless of base face-likeness scores. Similar results were observed in a replication study (n = 511). Overall, the present study demonstrated that intuitive thinking style at least partially contributes to the illusory perception of a face in everyday objects.

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12:00-1:30 PM (4075)

Ideal and Anti-Ideal as Framing in Political Evaluations. Psychological Analysis of Politician's Evaluation in the Light of the Contrast Model of Similarity. JUSTYNA OLSZEWSKA, University of Wisconsin Oshkosh, ANDRZEJ FALKOWSKI, University of Social Sciences and Humanities, SEAN CONWAY, University of Wisconsin Oshkosh, MAGDALENA JABLONSKA and MARIA SIDORUK-BLACH, University of Social Sciences and Humanities (Presented by Justyna Olszewska) – The 2016 presidential elections were different from the previous ones in terms of negative messages. The current study tested how positive and negative framing (ideal or anti-ideal politician) moderated

the evaluation of candidates at three different levels: emotional, cognitive and behavioral. Results revealed that similarity judgments of Clinton and Trump to an anti-ideal politician did not differ the two candidates. However, differences were found for the candidates' similarity to an ideal politician, with Clinton having more commonality with the ideal politician than did Trump. Moreover, the category activated (ideal or anti-ideal) moderated the evaluation between two opposing politicians. Namely, there were no differences between Trump and Clinton for voting intention and affective evaluation when the two were presented against the anti-ideal politician. The positive category revealed differences between the two politicians for voting intention and affective evaluation, with a higher positive attitude towards Clinton. The findings were further corroborated by the results of a multidimensional scaling analysis. The study has implications for political marketing and are discussed within the contrast model of similarity.

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12:00-1:30 PM (4076)

Does Shifting Attention Influence Numerical Processing? ANDREW CLEMENT, ALEXANDRA MOFFAT, and JAY PRATT, University of Toronto - Many theories suggest that numbers and space share a common representation, with small numbers associated with left responses and large numbers associated with right responses. There is also evidence that viewing numbers can produce spatial shifts of attention, suggesting that attention may play a role in the spatial representation of numbers. Here, we investigated whether spatial shifts of attention can also influence numerical processing. Participants viewed leftward or rightward peripheral cues followed by small or large numbers, then judged the parity or magnitude of the numbers. For parity judgments, both cue direction and number magnitude facilitated spatially compatible responses. For magnitude judgments, only cue direction facilitated spatially compatible responses. In both cases, cue direction did not influence numerical processing. These findings suggest that while numbers and space may share a common representation, this representation is much stronger at the response level than at the attentional level. Email: Andrew Clement, as.clement@utoronto.ca

12:00-1:30 PM (4077)

Response Time Modeling Supports a Late Interaction Account of the Size-Congruity Effect. KRISTEN A. BOWMAN and THOMAS J. FAULKENBERRY, *Tarleton State University* (Sponsored by Tom Faulkenberry) – The size-congruity effect occurs when numerical magnitude interferes with judgments of physical size. Various accounts propose that this interference is either encoding-related or decision-related. To discriminate these accounts, we used a shifted Wald model to index the underlying cognitive processes via estimates of drift rate, response threshold, and nondecision time. We administered a single digit physical comparison task and manipulated congruity. We found that the drift rate for incongruent trials was smaller than for congruent trials, indicating that incongruent trials had a lower rate of information uptake .Also, the response threshold for incongruent trials was larger than for congruent trials, indicating that for incongruent trials more information needed to be accumulated before responding. Critically, for nondecision time, there was no difference between incongruent and congruent trials. This combination of results provides support for a late interaction account of the size-congruity effect, shedding further light onto decision-related models of number processing.

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12:00-1:30 PM (4078)

Numerical Cognition Patterns and Biases in Processing Time Values and Intervals. MICHAEL D. TUTTLE and LYNDSEY K. LANAGAN-LEITZEL, Eastern Connecticut State University (Presented by Michael Tuttle) - The present study extends the existing literature on numerical cognition to the processing of time. We were able to replicate some of the typical effects found for processing numbers. Participants showed a left-digit bias, where an interval with a greater change in the hours digit (e.g., 1:59 - 3:00) was perceived as longer than an equivalent interval with a smaller change in the hours digit (e.g., 2:00 -3:01). Participants also showed the distance effect, but only for the minutes position, responding faster with larger distances between two times. We also replicated the minimum effect; participants compared smaller time values (e.g., 1:00 to 3:00) faster than equidistant larger time values (e.g., 7:00 to 9:00). Surprisingly, participants were no faster to compare time values with differing numbers of digits (comparing 9:00 to 11:00). These results suggest that processing time values is similar to processing other numbers but not completely identical.

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12:00-1:30 PM (4079)

Endpoint Reversal and Digit Dependence in Numerical Estimation. KATHERINE WILLIAMS, CHENMU XING, HILARY BARTH, Wesleyan University (Sponsored by Hilary Barth) - Number line estimation (NLE) is strongly influenced by leftmost digit identity (Lai, Zax, & Barth, 2018): numbers like 302 are placed far to the right of numbers like 299 on a 0-1000 line, despite their almost indistinguishable magnitudes. To investigate the scope of this left digit effect (LDE), we used an atypical "reverse" (1000-0) number line. Undergraduates (N = 76) completed a typical 0-1000 and atypical 1000-0 NLE task. Preregistered analyses revealed left digit effects for both line types, with large effect sizes. Individual performance for both line types was consistent with theories that model NLE as a form of proportion estimation (e.g., Slusser, Santiago, & Barth, 2013). These findings provide novel support for proportion estimation theories of NLE, and they demonstrate that left digit effects in NLE are robust in the face of potential moderators including the direction of the response line.

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12:00-1:30 PM (4080)

Accuracy Feedback Does Not Reduce the Left Digit Effect in Number Line Estimation. KATHERINE WILLIAMS, KOLBI BRADLEY, HILARY BARTH, and ANDREA L. PATALANO, *Wesleyan University* (Presented by Katherine Williams)

(Sponsored by Andrea Patalano) - Recent work has revealed a left digit effect (LDE) in number line estimation (NLE) such that adults' estimates for numerals with different hundreds place digits but nearly identical magnitudes are systematically different (e.g., 499 is systematically placed too far to the left of 502; Lai, Zax, & Barth, 2018). Here we tested whether the LDE is influenced by accuracy feedback. Participants were assigned to either a feedback (n = 65) or a no-feedback (n = 65) condition. They completed three 120-trial blocks of an unspeeded 0-1000 NLE task. In the feedback condition, accuracy feedback was given in the middle block only. Pre-registered analyses revealed a LDE in all blocks in both conditions, and accuracy increased from the first to the last block. However, feedback did not lead to a reduction in the LDE. We conclude that the LDE is a robust phenomenon that is not easily corrected with simple feedback. Email: Katherine Williams, kwilliams03@wesleyan.edu

12:00-1:30 PM (4081)

Novice Versus Expert Algebraic Problem-Solving Strategies: An Eye Tracking Approach. KRYSTAL KAMEKONA-MENDOZA (J. Frank Yates Student Travel Award Recipient), and MARK H. ASHCRAFT, University of Nevada, Las Vegas (Sponsored by Mark Ashcraft) - Using an algebraic problemsolving task, we examined performance differences between novices (undergraduate College Algebra students) and experts (graduate students with a substantial background in mathematics). Participants were presented with small and large problems in the following formats: Ax = B, Ax + B = C, and Ax + B = Cx + D, where x was either a whole number or a decimal/fraction. Reaction time, fixation duration, and number of refixations show clear expertise effects, while there were no performance differences between the groups for number of fixations or percent accuracy. Regression analyses reveal that working memory span was a good predictor of reaction time performance for the novice group only. These results collectively support previous research in that experts not only have more experience, but this additional experience leads to greater efficiency in retrieving domain-specific knowledge. Email: Mark H. Ashcraft, Mark.Ashcraft@unlv.edu

12:00-1:30 PM (4082)

An Investigation of Mathematics Language and Its Relation with Mathematics and Reading. AMANDA L. MCGRAW, Jacksonville University, MICHAEL P. KASCHAK and COLLEEN M. GANLEY, Florida State University (Sponsored by Michael Kaschak) - Growth in mathematical skill is correlated with growth in reading skill across development, showing a bidirectional relationship (e.g., Duncan et al., 2007). It has recently been demonstrated that an important component of the language-math relationship is the development of math-specific language skills. These Mathematical Language (ML) skills are predictive of mathematical performance above and beyond the contribution of general language skill. Here, we examine the relationship between ML and mathematics performance in kindergarten students. Researcher-developed assessments of skill in mathematics and reading, and in knowledge of ML, were administered to 610 kindergarten students in the fall of their kindergarten year. Preliminary results suggest that mathematics, reading, and ML are concurrently related in kindergarten. Although both ML and reading predict math performance, reading appears to be a stronger predictor of math performance in kindergarten. These findings support the claim that math-specific language may be important to the development of mathematical ability.

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12:00-1:30 PM (4083)

The Cognitive Reflection Test and Detecting a Lying Calculator: A Test of Predictive Validity. JOSEPH A. MARTIS, MARK S. LACOUR, and TYLER DAVIS, Texas Tech University - Error monitoring is critical for mathematical problem solving. The current study focuses on two measures, cognitive reflection and numeracy, and how they relate to people's ability to detect errors on a "lying calculator". Participants completed math problems, a numeracy scale, and Cognitive Reflection Test (CRT). An on-screen calculator occasionally produced wrong answers or "lies". For example, one question asked how old a woman born in 1942 would be in 1994; the calculator produced an answer of 114. Surprisingly, suspicion behaviors (e.g., rechecking) were not associated with CRT regardless of incentive (reward or no reward conditions), problem presentation (abstract or concrete), or numeracy. In contrast, numeracy was significantly associated with both error detection and CRT. These results suggest that CRT may not predict error detection ability during mathematical problem solving. Future versions of CRT should examine modifications that increase its predictive validity for mathematical problem solving while remaining distinct from numeracy.

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12:00-1:30 PM (4084)

How Do Kindergarteners Reason About Ratios? -- Evidence from 2D and 3D Quantities. YINGYING (JENNIFER) YANG, Montclair State University, WEI HE, Educational Research Center Nanshan Bureau Shenzhen - Recent research has suggested that young children may have primitive knowledge about ratio and proportions. However, it is unclear how precise this representation is. By asking participants to indicate ratios on a scale, we were able to examine the correspondence between participants' obtained ratios and expected ratios. Four- to six years old conducted a series of our tasks. For two 2-Dimensional (2D) tasks, participants judged ratio relations of quantities that do not require 3-Dimensional (3D) projection but may or may not require integrating two parts. In two 3D tasks, participants judged ratio relations of quantities that require 3D projection but may or may require integrating multiple spatial dimensions. Overall, results found that children had fundamental abilities to provide relatively accurate and consistent ratios. However, it was impacted by the type of quantities and whether the task involved information integration. Young children were less competent when they need to integrate part and whole and when they need to integrate multiple spatial dimensions. Email: Yingying Yang, yangyi@montclair.edu

12:00-1:30 PM (4085)

Numbers and Words: Magnitude Effects for the Comparison of Graded Adjectives. R. BROOKE LEA, Macalester College, EMILY SANFORD, Johns Hopkins University, OLIVIA SHAFFER, Macalester College, SASHANK VARMA, University of Minnesota (Presented by R. Brooke Lea) - There is a long history of investigating the relation between language and spatial processing (Clark & Chase, 1972; Morrow et al., 1987; Glenberg & Kaschak, 2002). Here, we consider whether language and mathematics recruit analogous mental mechanisms. Prior research has established that people understand numbers using magnitude representations (Moyer & Landauer, 1967; Siegler, 2016). We investigated whether they also use magnitude representations to understand graded adjectives, e.g., the quantity sequence none, some, most, all. Participants performed a standard number comparison task (i.e., which is greater, 1 vs. 2?) and a novel word comparison task (i.e., which is more, some or most?). The latter varied two factors: three levels of distance between the adjectives, and whether the underlying sequence spanned a midpoint (e.g., the heat sequence cold, cool, warm, *hot*) or not (e.g., the quantity sequence above). We found a main effect of distance, consistent with the prediction that graded adjectives are compared using magnitude representations, and also a boundary effect, with comparisons faster across the second and third word of midpoint sequences (e.g., cool vs. warm) vs. no-midpoint sequences (e.g., some vs. most). Email: R. Brooke Lea, lea@macalester.edu

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12:00-1:30 PM (4086)

Modeling Morphological Bootstrapping of Children's Number Word Acquisition. QIHUI XU, The Graduate Center CUNY, MARTIN CHODOROW, Hunter College, CUNY, VIRGINIA VALIAN, Hunter College, CUNY (Sponsored by Martin Chodorow) - Monolingual children whose native language marks the singular/plural distinction (e.g., English) acquire the number word 'one' faster than children whose first language lacks the distinction (e.g., Mandarin; Le Corre, Li, Huang, Jia, & Carey, 2016). However, studies of children speaking different languages also have confounding variables such as culture and parent input. Here we compensate for those limitations through computational modeling. Language input (a number word and a noun) either with or without numerical morphology were fed into a simple neural network model (NN) which learns to predict a corresponding number of objects given the language input. The model provided with the singular/plural distinction learns significantly faster than the one without the distinction (t(2, 18) = 4.554, p < .001). Model analyses show that it is the different representations of singular/plural nouns in the input layer of NN that make the model learn faster, supporting the account of morphological bootstrapping on number word learning. Language can facilitate number word learning via its morphological structure.

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12:00-1:30 PM (4087)

Development of an Autonomous Management System for Human-Machine Teaming with Multiple Interdependent Tasks. MARY E. FRAME, Wright State University, JENNIFER S. LOPEZ, CHRISTOPHER W. MYERS, CHRISTOPHER A. STEVENS, and JUSTIN R. ESTEPP, Air Force Research Laboratory, ALAN S. BOYDSTUN, Wright State University - Advances in automation have increased productivity and data throughput in many single and multi-task applied work environments. As this trend continues, automation may enable fewer individuals to monitor additional simultaneous data sources with increased complexity and cognitive demand. Increased throughput may be accomplished by developing assistive automation with the goal of optimizing system performance through task redistribution across team members (machines & humans). Toward this end, we developed an Autonomous Manager (AM) to dynamically evaluate task performance and cognitive workload to determine when tasks should be reallocated across team members and which tasks should be reallocated. When to reallocate is determine using machine learning model prediction based on physiological changes that reflect increasing cognitive load (e.g., electroencephalography, cardiopulmonary measures, galvanic skin response, eye tracking, etc.) Which tasks to reallocate is determined through a process called cognitive metrics profiling to determine which cognitive capacities (vision, audition, memory, etc.) are most likely loaded. The AM will operate within a series of interdependent tasks in real-time across teammates (human & machine).

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12:00-1:30 PM (4088)

Virtual Environments' Effects on Working Memory, and Mood: A Pilot Study. KAEDYN W. CRABTREE and EMILY SCOTT, University of Utah, RACHEL HOPMAN, Northeastern University, TY MCKINNEY, SARA LOTEMPLIO, AMY MCDONNELL, DAVID L. STRAYER, and BERT N. UCHINO, University of Utah (Sponsored by David Strayer) - Increased use of technology and time spent in urban environments are associated with depletion of cognitive resources, leading to mental fatigue, and an increased prevalence of mental illness. Attention Restoration Theory (ART) suggests that exposure to natural environments can restore depleted attentional resources and improve mood. However, it is unclear whether these benefits extend to virtual reality (VR) nature environments. Participants (N=42) completed measures of mood using the Positive and Negative Affect Schedule (PANAS) and working memory performance using the Operation Span (OSPAN) before and after exposure to nature or urban VR environments. Results suggest that exposure to VR nature can significantly buffer against a decline in mood compared to VR urban environments, demonstrating partial support for ART. Additionally, the VR nature condition experienced a marginally significant improvement in OSPAN performance compared the VR urban condition. The use of VR could provide access to natural environments for those who are unable to spend time in real-world nature and could potentially provide restorative henefits

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12:00-1:30 PM (4089)

Using the Internet "Raises the Bar" for Precision in Self-Produced Question Answering. KRISTY A. HAMILTON, University of Illinois at Urbana-Champaign, JESSICA SILER and AARON S. BENJAMIN, University of Illinois at Urbana-Champaign (Sponsored by Aaron Benjamin) - In many real-life memory situations, people control the grain size (precisioncoarseness) of the information they report based on goals of accuracy and informativeness. Two experiments examined whether searching the Internet influences the granularity of the information people later choose to report. Participants who initially searched the Internet for answers to trivia questions reported more granular (precise) ranges of estimates to later trivia questions answered from memory than participants who initially also answered the questions from memory, and from participants who initially were not asked any trivia questions. These results indicate that searching the Internet influences metacognitive processes underlying decisions about the granularity of the information we choose to report. The internet may "raise the bar" with respect to the informativeness of the information we feel obliged to offer.

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12:00-1:30 PM (4090)

The Role of Trust in Interaction with AI Agents. YONG-EUN RHEE, WHANI KIM, and SOWON HAHN, Seoul National University (Sponsored by Sowon Hahn) - The development of artificial intelligence led to the emergence of social robots. Many interactive agents have begun to appear in everyday lives in smartphones and home appliances. As people treat the agents as social actors, research on how people interact with AI agents is as important as the development of technology. In the present study, we used the Wizard of Oz paradigm to explore potential factors that influence trust in smart speakers. The interactive task consisted of small talk, scheduling and making reservations, word chain game, and weather forecasting. We measured trust along with perceived anthropomorphism of the smart speaker with various features. The results showed that human-like characteristics positively impact the interaction with the user. The present study also suggests the value of social science approach to the study of robot or artificial intelligence agent in daily life.

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12:00-1:30 PM (4091)

The Courage to Disassemble: Comfort Taking Apart Electronic Items Predicts Creativity. MAREIKE B. WIETH and ANDREA P. FRANCIS, *Albion College*, ELIZABETH HELDER, *Augustana University* – Previous research suggests the ability to think about taking an object apart is a key component to creativity (Gilhooly, Fioratou, Anthony, & Wynn, 2007). When asked to first physically or virtually disassemble a product, engineering students produced more creative modifications to the product than when simply asked to make modifications (Starkey, McKay, Hunter, & Miller, 2017). In a series of studies, we explored the role of imagined disassembly of electronic items (smartphone, computer mouse, & keyboard) compared to non-electronic items (paperclip & stapler) in creativity. Participants produced significantly fewer creative uses requiring imagined disassembly for the electronic items compared to non-electronic items. However, when prompted to imagine that the items had been taken apart, participants provided more creative uses than before the prompt. Finally, results showed participants' self-reported comfort taking apart electronic items significantly predicted the number of creative uses participants initially provided. No significant relationship was found for non-electronic items. These findings suggest that comfort taking apart electronic items predicts creativity and that disassembly instructions can increase creativity. Email: Mareike B. Wieth, mwieth@albion.edu

12:00-1:30 PM (4092)

The Effective Use of Powerpoint Presentations in Education. GARY D. FISK, Georgia Southwestern State University -PowerPoint presentations are a standard classroom feature, but there are relatively few evidence-based recommendations for best teaching practices. A comprehensive review of pedagogical studies was performed to determine the best educational approaches for multimedia presentations. PowerPoint has not been shown to reliably raise student educational outcomes compared to chalkboards, which raises doubts about prevailing presentation practices. Educational presentations need a storylike structure to engage emotions and avoid information overload. High visibility designs (large fonts, high contrast) are recommended for making important ideas salient and creating an inclusive classroom environment. Slides with assertionevidence layouts may be more effective than traditional bullet point formats. Posing questions is essential for promoting higher order thinking. In closing, educators can utilize PowerPoint more effectively if the presentation design is based upon sound pedagogical principles.

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12:00-1:30 PM (4093)

The Roles of Immersion and Presence in Episodic Memory Performance in Virtual Reality. S. ADAM SMITH and NEIL W. MULLIGAN, University of North Carolina (Sponsored by Neil Mulligan) - Although virtual reality (VR) represents a promising tool for psychological research, much remains unknown about how different properties of VR environments may affect episodic memory performance. Two closely related characteristics of VR are immersion (i.e., the objective degree to which VR naturalistically portrays a facsimile of an analogous real-world environment) and presence (i.e., the subjective sense of being "mentally transported" to the virtual world). The current study assessed how presence and memory were affected by three individual manipulations of immersion: field of view, unimodal (visual only) vs. bimodal (visual and auditory) environments, and the realism of lighting effects (e.g., the occurrence or absence of shadows). Moreover, the study sought to determine whether presence might serve as a mediating factor between effects of immersion on memory. Results varied between different manipulations of immersion, suggesting that outcomes of one property of immersion may not be representative of immersion in general. However, no evidence

for a mediating effect of presence emerged, thus revealing a degree of independence between immersion and presence with regard to their influence on episodic memory performance. Email: S. Adam Smith, s.adam.smith0@gmail.com

12:00-1:30 PM (4094)

Study of Pedestrian-Vehicle Interaction Using Virtual Reality. YOON KYUNG LEE, MIJIN KWON, and SOWON HAHN, Seoul National University - As smart cities become more prevalent, understanding the interactions between humans and autonomous agents is important. We explored the interaction between pedestrians and vehicles to propose contextually appropriate movement of vehicles. We developed a simulated crosswalk using Virtual Reality (VR) technology. The experiment consisted of 54 trials with 8 conditions including 3 independent variables: car size (small, medium, and large), car speed (go-slow, slow-stop, and sudden-stop), and companion (yes and no). We measured success rate and duration of crossing, and head direction to see 'looking around' behavior. Our results show car size, speed, and presence of companion affected pedestrian movement. We further examined individual differences in crossing decisions and durations by time. We discuss implications for designing safe autonomous vehicles. Email: Yoon Kyung Lee, yoonlee78@snu.ac.kr

12:00-1:30 PM (4095)

Validating Galvanic Skin Response as a Measure of Cognitive Workload. MARTIN LOCHNER, University of Waterloo, ANDREAS DUENSER, Commonwealth Scientific and Industrial Research Organization, SETH SIRIYA, University of Melbourne, ANDREW HEATHCOTE, University of Tasmania - Measurement of cognitive workload in real-world, taskcritical environments requires methodology that is accurate and easy to employ, yet which does not impose on primary task performance. Here we attempt a validation of Galvanic Skin Response as a measure of cognitive workload, using the ISO 17488:2016 Detection Response Task, which requires participants to respond to a stimulus every 3-5 seconds. Time-domain GSR presents a non-monotonic, 'inverted-U' function in response to a task difficulty manipulation. However, frequency domain metrics of the GSR signal mirrored the linear increase in difficulty, and the associated linear increase in the DRT measure of cognitive load. We conclude that the time-domain GSR signal may be indicative of immediate physiological stress, while the frequency-domain may be better suited to measuring levels of cognitive workload without the potential distraction associated with the DRT. Email: Martin Lochner, mlochner@uwaterloo.ca

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12:00-1:30 PM (4096)

Do Our Storytelling Abilities Change as We Age? Exploring the Underlying Semantic Mechanisms Related to Discourse Production. ABIGAIL L. COSGROVE and MICHELE T. DIAZ, *Pennsylvania State University* (Presented by Abigail Cosgrove) (Sponsored by Michele Diaz) – Storytelling is a vital aspect of language processing that requires successful integration of characters, events, and actions. Coherent stories include the necessary information to effectively transition between utterances and convey the overall gist. Since older adults produce more off-topic speech, it remains unclear whether the quality of a narrative will sustain age-related production declines. Moreover, how does semantic network organization affect their storytelling coherence? We hypothesized that individuals with high storytelling ability will have a more interconnected semantic network, as assessed by a higher Latent Semantic Analysis (LSA) value. We examined story elicitations and categorical fluencies from 90 individuals across the lifespan (ages 20- 80). Preliminary comparisons indicated that semantic network strengths ($\beta = .0004$, p = .07) and global coherence ratings ($\beta = -.002$, p = .12) show stability across the lifespan, but local coherence declined with age ($\beta = -.003$, p = .04).

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12:00-1:30 PM (4097)

Behavioral Dynamics in Married Couples' Conflict Resolution Conversations. KATHERINE CHIA, MICHAEL P. KASCHAK, and ANDREA L. MELTZER, Florida State University -This study examined the degree to which the conversational dynamics of married couples predict their feelings of progress toward resolving marital conflicts. We used the Specific Affect Coding System (SPAFF) to code recordings of 52 couples' conversations (SMU Newlywed Project) for displays of positivity, negativity, and expressions of interest and validation (following Main et al., 2016). Each couple engaged in two problem-solving discussions--one concerning a problem that the husband chose and one concerning a problem that the wife chose. We analyzed the temporal structure of the SPAFF codes using cross recurrence quantification analysis. Overall, we found that the recurrence rate for each type of behavior (positivity, negativity, interest/validation) was correlated across conversations, suggesting that these reflect stable patterns of behavior within the couples. In addition, we found that the recurrence rate predicted the spouses' ratings of the progress made on resolution of the conflicts.

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12:00-1:30 PM (4098)

Believing a Robot Is a Human Improves Impression Formation. ALINA S. LARSON and JEAN E. FOX TREE, *University of California, Santa Cruz* – As telemarketers demonstrate, the line between robotic human voices and humanlike robot voices can be hard to distinguish. We assessed how voice type and beliefs about the source of a voice affected judgements of speaker characteristics (trustworthiness, friendliness, intelligence, and nervousness). Participants listened to either a text-to-speech or human voice with one of two backstories: either the voice was produced by a computer program to sound like a UC Santa Cruz college student or it was produced by a UC Santa Cruz college student using an artificial voice box designed to help those with vocal disorders. Human voice and human backstory were rated more positively (more trustworthy, friendly, intelligent, and less nervous) than text-to-speech voice and computer backstory. For now at least, people still prefer human to synthesized voices, even if they only imagine they are listening to humans.

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12:00-1:30 PM (4099)

Prosody of Punctuation in Texting: Periods vs. Exclamation Marks. APRIL M. DRUMM-HEWITT and NOELLE WRIGHT, Simpson College - Texting does not easily allow for communication of prosody, or tone of voice. Previous work (Gunraj et al., 2016) found punctuation may now convey prosody, specifically periods. The present study used a more descriptive measure and investigated the perceived meaning of exclamation points as well. The punctuation used in texts had an effect on perceived emotional valence. This finding was significant when the data were analyzed by items [F(2, 30)]= 19.1, p<.001, partial η^2 = .56] and by participants [F(1.56, 156.18) = 152, *p*<.001, partial η^2 = .603]. Post-hoc tests (Scheffe, p<.001) revealed that participants rated messages with a period (M = 2.60, SD = .545) to be more negative than messages with no punctuation (M = 2.35, SD = .472), and rated messages with no punctuation as more negative than messages with an exclamation point (M = 1.70, SD = .466). These findings confirm our hypotheses that text messages with periods are interpreted as more sarcastic and aggressive than those without punctuation, reaffirming and expanding on previous work. The present findings also newly suggest that text messages with exclamation points are interpreted by readers as more sincere and friendly than messages with no punctuation or periods. Email: April M. Drumm-Hewitt, amdrumm@gmail.com

12:00-1:30 PM (4100)

The Effect of Cognitive Load, Interlocutor Interaction, and Individual Differences on Communication Planning and Monitoring. ESTER NAVARRO, Claremont Graduate University, BROOKE N. MACNAMARA, Case Western Reserve University, ANDREW R.A. CONWAY, Claremont Graduate University (Sponsored by Andrew Conway) - The cognitive mechanisms engaged in communication planning and monitoring are poorly understood. Some argue that communication engages relatively automatic processes while others argue that it is more effortful. We hypothesized that working memory (WM) is taxed during communication, especially under cognitive load and when an interlocutor is absent. Participants completed a communication task under different load conditions with an absent (E1) or present (E2) interlocutor, whose perspective differed from the speaker's. The third experiment replicated E1 and assessed individual differences. In all three experiments, when cognitive load increased, speakers produced fewer descriptions and made more egocentric errors. However, interlocutor presence and higher levels of cognitive ability mitigated the effect of load. The results suggest that communication is effortful but having high WMC and an interlocutor present can facilitate performance. These moderating factors explain why competing theories have been supported by different outcomes and it provides a framework to reconcile previous research.

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12:00-1:30 PM (4101)

Little Words in a Big Corpus. ALLISON NGUYEN, ANDREW J. GUYDISH, YASMIN CHOWDHURY, and JEAN E. FOX TREE, University of California, Santa Cruz (Sponsored by Travis Seymour) - We examined whether there was a difference in the types of backchannels used when participants engaged in chit-chit versus task-related conversation. Dyads engaged in a phone task where one participant identified public art by walking around downtown Santa Cruz, California, and the other participant gave directions while in the lab. Backchannels (words like ok, yeah) were counted using an automated program and were coded as generic, specific, vertical, or horizontal. We examined the type and quantity of backchannels used when participants were giving and receiving directions versus when they were in transitional periods between art pieces. We also analyzed word choice differences with LIWC. There were more vertical (with ok) and more specific (without ok) backchannels in task-related communication. There were similar rates of horizontal/generic backchannels across task-talk and chit-chat. We also discovered differences in word choices, including that people use more second person pronouns in chit-chat. Email: Allison Nguyen, anguy194@ucsc.edu

12:00-1:30 PM (4102)

Prosody, Prosodic Convergence, and Performance in the Montclair Map Task. CHRISTOPHER KELLO and SARA SCHNEIDER, University of California, Merced, JENNIFER S. PARDO, Montclair State University, KATHLEEN COBURN, University of California, Merced (Presented by Christopher Kello) (Sponsored by Christopher Kello) - Prosody is a feature of speech that carries information about meaning and communication in conversations, including the convergence and alignment of conversational partners. Prior studies have found some relationship between measures of convergence and the effectiveness of communication, but results have been mixed. The present study further investigated the relationship between convergence and performance by analyzing the effects of prosody and prosodic convergence on performance in a dyadic difference finding task that required spoken interaction. Allan Factor analysis was used to measure prosody in terms of hierarchical temporal structure (HTS), and complexity matching was used to measure prosodic convergence. Task performance was correlated with the degree of prosodic emphasis, as measured by HTS, but only when males were paired together. Convergence in HTS also correlated with performance, but only during the first minutes of interactionthere was no reliable correlation once partners became familiar with the task and each other.

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12:00-1:30 PM (4103)

Effect of Relevancy and Importance Judgments on a Multiple-Document Writing Task. KATHRYN S. MCCARTHY, Georgia State University, LAURA K. ALLEN, University of New Hampshire, DANIELLE S. MCNAMARA, Arizona State University, JOSEPH P. MAGLIANO, Georgia State University – Task-oriented reading emphasizes that the information that is important for understanding a specific text, may not be relevant for a particular task (Anmarkrud et al., 2013). This study examined how biasing readers to attend to task-relevant information versus text-important information affected the quality of an integrative essay. Participants (n = 142) read a set of four texts about one of two socio-scientific topics. After an initial reading, participants were given the essay prompt and asked to revisit the texts. Participants were randomly assigned to rate the relevancy of each sentence, rate the importance of each sentence, or reread the texts (control). Consistent with predictions of task-oriented reading, sentences that were rated as highly important were not always rated highly relevant. The relationship between relevance and importance judgments and the content of the essays was explored. This study has implications for theories of task-oriented reading.

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12:00-1:30 PM (4104)

My Title is Up Here: The Effect of Title Position on Situation Model Comprehension. ANDRIANA L. CHRISTOFALOS, University of Illinois at Chicago, GARY E. RANEY, University of Illinois at Chicago (Sponsored by Gary Raney) - When we read a passage, comprehension of the situation model (gist or theme) can be facilitated by presenting readers with a title that describes the theme of a passage. The purpose of our study was to examine when the presence of a title influences situation model comprehension for difficult to understand passages. We presented participants with vague passages in which the situation described was unclear without the title. Participants read four passages with the title presented before each passage (benefiting encoding and retrieval) and then read four passages with the title presented immediately after each passage (benefiting only retrieval), or vice versa (read Title-After then Title-Before passages). Participants completed a quiz after each passage. Situation model comprehension was better in the Title-Before than the Title-After condition, but this difference did not reach statistical significance. However, interesting order effects were found; the title effect was larger for participants who read Title-After passages first. Participants who saw Title-Before passages first seemed to give up on comprehending the situation model when reading Title-After passages, which implies the titles were used strategically in this task.

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12:00-1:30 PM (4105)

The Role of Analogical Explanations and Reasoning in Knowledge Revision. RINA HARSCH and PANAYIOTA (PANI) KENDEOU, University of Minnesota – Knowledge revision refers to the modification of existing knowledge in memory to accommodate newly acquired information. Given the onslaught of fake news, it is imperative that we investigate the cognitive processes involved in revision of misconceptions and the tools and abilities that facilitate knowledge revision. One tool that promotes knowledge revision is the refutation text, which states that a misconception is false and provides the correct idea. Previous research has found that refutation for the correct idea. This study examined the extent to which the use of analogical explanations in refutation texts affects both knowledge revision processes and outcomes during reading. Individuals' analogical reasoning was also considered. The findings provide new insights into how reasoning and comprehension processes influence revision during reading. Email: Rina Harsch, harsc008@umn.edu

12:00-1:30 PM (4106)

Let's Explain: The Differential Effects of Self-Explanation and Think-Aloud Instructions on Multiple Document Comprehension. LACEY C. ZACHARY and LAURA K. ALLEN, Mississippi State University (Sponsored by Laura Allen) - Comprehension is a complex process that involves constructing meaning from texts. When readers encounter cohesion gaps, they must generate inferences to make sense of the text information. Self-explanation is a strategy that has shown to increase inference generation during reading. However, it is unclear whether this strategy can be employed to promote inferences across multiple texts. The current study examined the differential effects of reading instructions on multiple document comprehension. Participants (n=164) were instructed to either self-explain or think-aloud while reading four global warming texts. They then completed three tasks that measured surface and deep (within- and across-text inference) comprehension. The self-explanation condition significantly outperformed the think-aloud condition on the within-text inference task. Additionally, there was a significant interaction between prior knowledge and condition for the across-text inference task. These results extend previous research on single-text comprehension and provide insight into how selfexplanation enhances comprehension in multiple document contexts.

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12:00-1:30 PM (4107)

The Role of Visual and Spatial Memory in Text Comprehension. MICHAEL LONG and W. MATTHEW COLLINS, Nova Southeastern University - Good reading comprehension requires creation of a situation model to track dimensions of a text including any characters, goals, and of interest in the current research, spatial and visual information described in the text. This experiment examined how individual differences in visual and spatial working memory play a role in reading comprehension. First, participants completed a task assessing their visual and spatial working memory. Participants then read a series of passages that varied in the number of visual and spatial details of the environment in the text. After reading these passages, participants answered questions about the visual descriptions and drew a map of the environment to measure their comprehension of the spatial layout in the text. Although visual reading comprehension was not predicted by either visual or spatial working memory, both were able to predict spatial reading comprehension.

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12:00-1:30 PM (4108)

Auditory Comprehension of Double Versus Single Modal Constructions in Mainstream American English Listeners. HOLLY A. ZAHARCHUK, JANET G. VAN HELL, and

ADRIANNA SHEVLIN, Pennsylvania State University (Sponsored by Janet Van Hell) - Many speakers of Southern United States English use a verb construction called a double modal, which comprises two consecutive auxiliary verbs. For example, the sentence "She said we might could go Tuesday" combines the modals *might* and *could*, which is not standard in Mainstream American English (MAE). While previous sociolinguistic research has studied syntactic variation across American English, very little psycholinguistic research has explored the relationship between intralingual diversity and language processing. The present study used Event-Related Potential (ERP) analysis to investigate online auditory comprehension of double modals versus single modals in MAE listeners. Results revealed that double modals elicited an early left-anterior negativity (ELAN) followed by a P600 effect, which suggests that unfamiliar dialectal variation in syntax engages both automatic detection of deviations from standard word-category rules and sentence-level syntactic reanalysis. These findings are interpreted in light of descriptive theories of language processing.

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12:00-1:30 PM (4109)

Understanding Triadic Communication in Medical Conversations with Older Patients: The Impact of MEUTER Companions. and **JOANNE** RENATA BRASSINGTON, Queensland University of Technology -Older patients often bring a companion to their medical consultations. The nature of those conversations may well change because communication is now triadic but how, and what might be the impact of such changes? We analyzed practitioner-patient consultations with older patients, some of whom brought a companion. Our qualitative analyses were based in Communication Accommodation Theory and we used Discursis to visualize each conversation across time. Speaker contributions varied across consultations and reflected the consultations' individual focus. We observed greater information sharing in triadic consultations, which were characterized also by higher engagement. All consultations evidenced positive and negative communication behaviors, but triadic consultations revealed more negative patterns, including a tendency for practitioners to exclude patients by aligning instead with their companions. Importantly however, our analyses showed companions to be supportive of the patient, and to facilitate engagement and information sharing. Given that older patients can be so easily sidelined, practitioners are cautioned to monitor their interactions with their patients' companions to protect their patient's voice.

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12:00-1:30 PM (4110)

The Time-Course of Metaphor Comprehension: Literal and Metaphorical Interpretations Linger. IOLA K. PATALAS and ROBERTO G. DE ALMEIDA, *Concordia University* – What are the moment-by-moment linguistic and cognitive processes involved in understanding copular metaphors such as 'my lawyer is a shark'? Most research into metaphor comprehension has employed offline reading tasks that provide little insight
into the time-course of metaphor processing and the nature of the information accessed when metaphors are understood. In order to investigate what representations are accessed in the first moments after a listener hears a metaphor, the present study used a cross-modal lexical decision paradigm (Swinney, 1979) with brief (80ms), masked target presentations at the recognition point of the vehicle word ('shark'), and 500ms later. Metaphors were compared to similes ('my lawyer is like a shark'). We obtained significant priming of both figuratively and literally related target words at both time points for both types of sentences, but no significant differences between conditions. Results are compatible with theories that postulate an exhaustive or ordered form of access to different word senses (e.g., Giora, 2003; Carston, 2010), suggesting that both literal and metaphorical interpretations linger in the mind even after the 'intended meanings' have been understood.

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12:00-1:30 PM (4111)

Nonnative Speech Increases Susceptibility to Semantic Illusions. LEIGH H. BURNETT, JANET GEIPEL, and BOAZ KEYSAR, University of Chicago (Sponsored by Boaz Keysar) -If you ask an average person how many of each animal Moses took on the ark, most people familiar with biblical stories would readily say "two." This is despite them knowing that the biblical story was about Noah, not Moses. Such questions contain semantic distortions, in which a key detail is changed to a semantically related but incorrect referent making the question anomalous. In two experiments we examined whether nonnative accented speech influences the detection of such semantic distortions. We predicted and found that in comparison to native speech, nonnative accented speech hinders the detection of such anomalies. This effect extended to both strongly related imposters (Noah vs. Moses) and more weakly related imposters (Noah vs. Adam). Importantly, accuracy on CRT questions was unaffected by accent which argues against a simple load explanation. Hence, while people may expect nonnative speakers to make more errors when they speak, native listeners are less likely to notice the linguistic errors that nonnative accented speakers make.

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12:00-1:30 PM (4112)

Exaggerated Fonts Can Disambiguate Emotional Homographs and Emotionally Ambiguous Sentences. JESSICA E.D. ALEXANDER and MONICA L. SEWELL, Centenary College of Louisiana - In design projects, fonts are often used in an attempt to elicit specific responses from readers, but empirical evidence to back up design decisions regarding font is typically sparse. However, research on emotional tone of voice has shown that homophones' meanings can be resolved through the speaker's tone of voice. The current study draws on emotional tone of voice research to examine whether fonts can resolve the ambiguity of homograph meaning or the emotional valence of ambiguous sentences. Participants were presented with homographs and neutral ambiguous sentences in exaggerated positive and negative fonts or in typical serif and

sanserif fonts. They chose the definition of the word in a twoitem forced choice paradigm, then they rated the emotionality, positivity, and negativity for all words and sentences. Emotional valence of the ambiguous sentences was predicted by the font it was presented in for the exaggerated fonts but not the typical fonts. Emotional homograph meanings that matched their exaggerated font were chosen significantly more often than chance but were at chance for typical fonts. These results contribute to our understanding of how written word form affects readers' activations of linguistic meaning.

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12:00-1:30 PM (4113)

Expect the Unexpected: Syntactic Adaptation and the Rise of Infrequency. JACK DEMPSEY, QIAWEN LIU, and KIEL CHRISTIANSON, University of Illinois at Urbana-Champaign - Studies investigating syntactic expectation adaptation to reduced-relative (RR) garden-path sentences (GP) have shown mixed results regarding penalties for a priori more frequent main-verb (MV) structures after repeated exposure to the former, as originally shown by Fine et al. (2013) (cf. Harrington-Stack et al., 2018). The failure to replicate this penalty brings into question whether readers can overcome years of exposure to stark frequency contrasts between continuations (e.g. RR vs. MV) and strengthens the divide between true expectation adaptation and syntactic satiation effects. Kaan et al. (2019) showed facilitation effects for 'and coordination' GPs in native English speakers after exposure to sentential complements (SC) (as opposed to compound NPs), but did not test for a penalty with NPs after SC exposure. Since the distribution of NP/SC continuations is more evenly distributed, repeated exposure to SC structures may trigger expectation adaptation in readers, as would be evidenced by slower reading times and/or worse comprehension question accuracy for NP structures after SC exposure. Implications for the role of exposure and frequency in models of syntactic processing, adaptation, and learning are discussed.

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12:00-1:30 PM (4114)

Effects of Lexical Predictability and Syntactic Structure on Fixation Times During Reading. MATTHEW W. LOWDER, GWYNNA RYAN, JACLYN OPIE, and EMILY KAMINSKY, University of Richmond - Although a large body of literature has shown that words that are predictable in the context of a sentence have shorter reading times than words that are unpredictable, very little work has investigated how the magnitude of the word predictability effect might be modulated by changes to the structure of the sentence. In the current eyetrackingwhile-reading experiment, we systematically manipulated the predictability of a target word, as well as the syntactic structure of the sentence. The syntax manipulation employed focus constructions (e.g., ...not only the bride but also the groom/ priest) and noun-phrase coordination (e.g., ...the bride and also the groom/priest). Results showed a significant interaction between predictability and syntactic structure in first-pass reading times on the target word, such that there was a robust predictability effect for the coordination condition, but no effect of predictability for the focus condition. Later measures revealed main effects of both predictability and syntactic structure. The results suggest that the phrase "not only x" may prompt readers to anticipate that something slightly unusual is coming up, thus eliminating any early predictability effects.

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12:00-1:30 PM (4115)

Focus Directs Attention, but Slows Processing. SHAYNE SLOGGETT, University of York, AMANDA RYSLING, University of California, Santa Cruz, ADRIAN STAUB, University of Massachusetts, Amherst - We report a boundary paradigm eye-tracking while reading study testing the hypothesis that readers use linguistic focus to predictively allocate attention to information in parafoveal vision. Specifically, we asked whether readers show a larger parafoveal preview benefit for focused material (here, the answer to a preceding Wh-question). We found that readers spent longer during first-pass reading for: (1) target words with invalid parafoveal preview; (2) focused words. We found no interaction of focus and parafoveal preview. These effects on first-pass reading were also observed in total reading times. Finally, readers were less likely to skip focused target words. These findings suggest that focus does not facilitate information uptake from parafoveal vision. However, readers are aware of which positions in a sentence are most informative prior to fixation and modulate their eye-movements so as to directly fixate focused information during first pass reading. These findings join existing work in suggesting that focus may encourage predictive allocation of attention, but that this increased attention delays processing, rather than facilitating it. Email: Shayne Sloggett, shayne.sloggett@gmail.com

12:00-1:30 PM (4116)

Natural Conversation Boosts Speaker Identity Effects in Native- and Foreign-Accented Spoken Sentence Comprehension: An Auditory ERP Study. SARAH GREY, Fordham University, YUSHUANG LIU, Pennsylvania State University, HENRY ZINK, Fordham University, JANET G. VAN HELL, Pennsylvania State University - Foreign-accented speech presents a challenge for sentence comprehension, as shown in ERP measures of semantic and grammar processing (e.g., Hanulikova et al., 2012). Some of this research suggests that ERPs are modulated by whether listeners can identify the nature of the foreign accent (e.g., Grey & Van Hell, 2017, Grey et al. 2018). In these studies, spoken sentences were presented in the absence of any visual cues identifying the speaker. To more explicitly test the effect of speaker identity on accented sentence processing, listeners were introduced in person to each foreign- and native-accented speaker using a confederate speaker paradigm. Measuring ERPs, participants listened to these speakers who made semantic or grammar errors in sentences or produced correct sentences. Semantic violations elicited an N400 to both native- and foreign-accented speech; the effect was larger for native-accented speech. Grammar violations yielded a late Nref to native-accented speech, but no effect to foreign-accented speech. In relation to previous work

(e.g., Grey & Van Hell, 2017), the data suggest that providing listeners with salient, in-person knowledge of foreign-accented speaker identity influences semantics more than grammar. Email: Sarah Grey, sgrey4@fordham.edu

12:00-1:30 PM (4117)

The Development of Orthographic Access During Spoken Word Recognition. AMY S. DESROCHES and KRISTIN KOZERA, University of Winnipeg, CHLOE A. KORADE, University of Alberta, EVAN W. FOREST, University of Manitoba - We used event-related potentials (ERPs) to investigate orthographic intrusion during spoken word recognition (SWR) in typically developing beginning readers (ages 6 & 7) and older school-aged readers (ages 8-12). Participants completed a picture-word matching task where they saw a picture and then heard a spoken word that matched (e.g., BALL-"ball") or mismatched the picture in one of three ways (orthographically similar (O+) rhyme: BALL-"wall", orthographically dissimilar (O-) rhyme: BALL-"doll", or unrelated: BALL-"suit"). Interestingly, both groups showed orthographic access during SWR, marked by differing N400 responses to O+ vs. O- rhyme mismatches. For older school-aged readers, orthographic effects were marked by reduced N400s to O+ vs. O- rhyme mismatches. Instead, beginning readers' N400 amplitudes were similar for all mismatch types; however, the N400 latency was impacted such that it peaked later for O+ rhymes over O- rhymes. The results indicate that access to orthography during SWR emerges early during reading development.

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12:00-1:30 PM (4118)

Semantic Ambiguity and Generation Effects with Adult Learners During Novel Word Learning. CAITLIN RICE and NATASHA TOKOWICZ, University of Pittsburgh -Ambiguous and unambiguous words are processed differently (e.g., Rice, Tokowicz, Fraundorf, & Liburd, 2019). During novel word learning homonyms (words with multiple unrelated meanings), polysemes (words with multiple related meanings), and unambiguous words may be differentially sensitive to training methods that enhance meaning representations, such as the generation effect (Slamecka & Graf, 1978). Native English speakers (N=27) learned unknown English homonyms, polysemes, and unambiguous words using a generation task (write a sentence containing a target word) or a control task (read a sentence containing a target word). Free recall results show better recall for ambiguous than unambiguous words, but no differences due to training condition. Meaning production results show that definitions for words in the generate condition were produced significantly more often than in the control condition, but no differences between word types. Results are examined in light of the semantic settling dynamics account (Armstrong & Plaut, 2016).

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12:00-1:30 PM (4119)

Call Me by My (Last) Name: Gender Bias Through Production About and Memory for Names. BETHANY GARDNER and SARAH BROWN-SCHMIDT, Vanderbilt

University (Sponsored by Sarah Brown-Schmidt) - We examine how gender bias is reflected in language use through the inferences comprehenders make about names. In a large-scale online experiment, participants see first names ranging from masculine to feminine, paired with common last names. We measure participants' rates of gendered pronoun production in a sentence completion task and rates of gender recall in a memory task, relative to the gender association of each name (normed separately). We hypothesized that results would replicate von der Malsburg et al. (2018) and Boyce et al. (2019): Participants consistently under-produce and under-recall feminine referents. The novel hypothesis is that this male bias will be stronger when referents are described using their last name only, rather than their first or full names. This suggests that people referred to by last name may be judged more competent and talented (Atir & Ferguson, 2018) because they are perceived as more masculine, which has implications for how we talk about women in professional and political settings. Email: Bethany Gardner, bethany.gardner@vanderbilt.edu

12:00-1:30 PM (4120)

Predictive Inference in Reading Comprehension. ADNAN REBEI, University of Illinois at Urbana-Champaign, KIEL CHRISTIANSON, University of Illinois at Urbana-Champaign (Sponsored by Kiel Christianson) - Reading comprehension requires the integration of various interacting components to achieve global coherent understanding of a text. These components include linguistic abilities, world knowledge, and memory capacity. For example, stereotypes or biases are both part of world knowledge but could influence the processing of an ambiguous text. Similarly, inference is a 'strategic' component of reading comprehension that is often used to speed up processing of a text by linking its distant parts. However, inference can be also used to set expectations about what might come ahead in the text. These expectations may or may not be required, as in elaborative inference, to understand the text but are dictated by memory constraints and the desire to remove ambiguities from the mental state of the reader. In this work, using stereotypes as a probe, we demonstrate how 'dumb' predictive inference can be automatically activated by stereotypes while processing a text. Email: Adnan Rebei, rebei2@illinois.edu

12:00-1:30 PM (4121)

Working Memory Effects in Subject-Verb Agreement Production. JANET L. MCDONALD, *Louisiana State University* – Producing correct subject-verb agreement for sentences with a singular head noun and plural local noun (e.g., "The novel in the libraries) is known to be difficult (Bock & Cutting, 1992). In this study we compared production of both declaratives (e.g., "The novel in the libraries is popular") and questions (e.g., "Is the novel in the libraries popular?") to preambles that varied in number of the head and local noun, and examined the relationship of working memory capacity to performance. The singular-plural condition was most difficult for both declaratives and questions, but this was manifested as more agreement errors and preamble alterations in declaratives and only more preamble alterations in questions. Participants with low working memory span had particular difficulty with correct production in the singular-plural condition for both declaratives and questions and made more agreement errors in this condition for the declaratives. These results fit with memory retrieval theories of agreement.

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12:00-1:30 PM (4122)

Encoding Phonologically Similar Words Across Young and Older Adults. HOSSEIN KARIMI and MICHELE T. DIAZ, Pennsylvania State University - Previous research has demonstrated that encoding similar words might be subject to interference, creating processing difficulty. However, other research shows that similarity might facilitate memory encoding. We investigated whether and how phonological similarity might affect memory encoding across young and older adults. We created experimental stimuli such as Luke agreed with Luis/Lucy/Brian/Sara after ..., in which two proper names needed to be encoded sequentially. We manipulated the gender congruence (Same- vs. Different-genders), as well as the phonological similarity (Similar vs. Dissimilar) of the two names, and measured brain activity on the onset of the second name. For both groups, we observed a frontal negativity with smaller amplitudes for Similar than Dissimilar names. Older adults also exhibited an N400 effect, with smaller amplitudes for Same- than Different-Gender names. These results show that phonological similarity facilitates encoding, and that older adults might perform good-enough encoding when the two names are gender-congruent.

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12:00-1:30 PM (4123)

A Rightward Directional Bias for Event Depiction in Representational Drawings. NAFISEH FAGHIHI (J. Frank Yates Student Travel Award Recipient), OMAR GARCIA, and JYOTSNA VAID, Texas A&M University (Sponsored by Jyotsna Vaid) - Cognitive research on drawing has uncovered spatial biases both in the facing of individual objects in isolation and in the depiction of events. The present study utilized a drawing task to extend the scope of inquiry into directional biases in event representation by examining how left to right and right to left readers depict different versions of an event. Specifically, we wondered whether the starting point vs. ending point of an event would engender different mental models or a single mental representation, with a single directional bias. The results suggest that there is a single mental representation that shapes both initiation and completion of events. Events are typically depicted in a rightward direction, regardless of whether the agent is initiating or completing the action. Moreover, this was observed regardless of habitual reading/writing direction, suggesting that action representations conform to a left to right movement arc. This is consistent with Chatterjee et al.'s (1999) suggestion that the left hemisphere is specialized for spatial attention with a vector from left to right. Apparently, learning to read and write in a certain direction does not influence the direction of this vector.

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12:00-1:30 PM (4124)

Self-Distancing and Visual Perspective: First, but Not Third, Person Perspective Predicts Self-Reported Distancing. LISA EMERY and OLIVIA GODFREY, Appalachian State University (Presented by Lisa Emery) - Prior research suggests that selfdistancing during recall of a negative autobiographical memory can reduce negative affect. Self-distancing can be accomplished through either adopting a spatially distanced perspective or reducing first-person pronoun use. In the current study, we examined correlates of self-distancing during stories of interpersonal conflict in both younger (N = 74, ages 19-34) and older (N = 59, ages 60-85) adults. After controlling for age, self-reported distancing was associated with decreased negative emotional experience during storytelling (β = .25, t = 2.88, p = .01). In addition, a series of linear regressions found that selfdistancing was associated with (1) lower levels of first-person perspective ($\beta = .39$, t = 4.78, p = .00), but not third-person perspective ($\beta = .09$, t = 1.12, p = .27), and (2) reduced use of first-person ("I") (β = .31, t = 3.54, p = .00) and third-person plural ("They") pronouns ($\beta = .26$, t = 2.94, p = .00). In line with previous research, reduced self-focus is an important mechanistic component of distancing, but in contrast to previous research, we found that self-distancing may not necessarily be achieved by taking on the perspective of a thirdperson observer.

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12:00-1:30 PM (4125)

Influences of Intergenerational Transmission of Autobiographical Memories on Identity Formation in First-Generation Immigrant Children. LUDMILA ISURIN and YULIYA BUQUOI, The Ohio State University (Presented by Ludmila Isurin) - This project delves into identity formation through intergenerational transmission of autobiographical memories, examining the impact of family stories that parents (n=32) tell their children (n=23) as they are growing up on the adult identity formation of those children. Through multigenerational interviews and questionnaires about family memory sharing, history, identity, and attitudes about key aspects, the study explored familial transmission of attitudes regarding nationality, discrimination, ethnic identity, and culture in Russian Jewish immigrants. The data were analyzed quantitatively and qualitatively. Findings focus on comparing parent and child generational attributes in aggregate, comparing children who immigrated as babies to those who had retained some personal memories, and looking at transmission of family identities from parents to specifically their children. Email: Ludmila Isurin, isurin.1@osu.edu

12:00-1:30 PM (4126)

The Effect of Current Appraisal of Success and Memory of Love Towards Mothers. MARIO ERNESTO HERRERA, University of Southern Mississippi, IAN M. MCDONOUGH, University of Alabama, LAWRENCE PATIHIS, University of Southern Mississippi (Sponsored by Ian McDonough) – As people experience successes in life, do they bias their memories of childhood? Past research has shown that current appraisals can distort memories of emotions (Levine, 1997). No previous research has investigated whether changing current appraisals of life success would affect important autobiographical memories. In Experiment 1, we found that within undergraduates ($M_{\rm age}$ = 20) with an external locus of control manipulating appraisals of success resulted in changes in childhood memories of love towards their mother. In Experiment 2, within the sample as a whole on Amazon Mechanical Turk (AMT; $M_{\rm age}$ = 35) increases in appraisal of life success led to increases in memory of love towards mothers. This is congruent with our finding that AMT participants had higher external locus of control than undergraduates. Current mood did not mediate the experimental effects. In life, therapy, and law, it may be important to know that successes may bias past memory of emotions.

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12:00-1:30 PM (4127)

Valence Is in the Eye of Beholder: A Comparison of Three Types of Valence Ratings. BURCUKAYA-KIZILÖZ, BÜŞRA ŞIMŞEK, and ÖMER YÜNCÜ, Eastern Mediterranean University -Depression is associated with reduced autobiographical memory (ABM) specificity (i.e. overgeneral memory/OGM). Valence is regarded as one of the contributing factors to OGMs, but results regarding the effect of valence on OGM are inconsistent. Yet, valence was conceptualized differently by different researchers: as valence of the cue words, valence of ABMs' rated by the participants and independent coders. This study examined whether these three types of valence are comparable. Participants with high and low BDI scores first rated the valence of negative and positive cue words and a week later, retrieved ABMs in response to these cue words and rated the ABMs in terms of valence. Two independent coders also rated the ABMs for valence. Results showed that for the negative cue word, both groups rated their ABMs more negatively than the cue words and the coders, but the difference was higher for the high BDI participants. For the positive cue words, low BDI group rated their ABMs more positively than the cue words and raters but for the high BDI group, ratings did not significantly differ from each other. These results suggest that further studies are needed to see whether these three types of valence contribute to OGM differently.

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12:00-1:30 PM (4128)

Characteristics of Memories Associated with Different Emotion Regulation Strategies. ALI I. TEKCAN, *Boğaziçi University*, SELEN KÜÇÜKTAŞ, *Bogazici* University (Presented by Ali Tekcan) – Whether emotion regulation (ER) is a separate autobiographical memory function is a matter of debate. In the present study, we addressed the link between negative autobiographical memories and emotional regulation strategies associated with these memories. We compared three ER strategies in terms of content, memory phenomenology, and effectiveness in mood regulation. Participants were asked to recall three negative ABMs for which they used one of the following ER strategies: brooding, cognitive reappraisal (CR) and thought suppression (TS). Memories for which CR was used were rated more positive than memories where brooding and TS were used. Moreover, memories for which brooding was employed were higher in sensory detail and emotional intensity than memories for which CR was employed. Email: Selen Küçüktaş, selenkucuktas@gmail.com

12:00-1:30 PM (4129)

Simulations of a Collective Future in Relation to Collective Memory. AYSECAN BODUROGLU, Bogazici University, A. REYYAN BILGE, Istanbul Sehir University, DENIZ HACIBEKTASOGLU and ALI İ. TEKCAN, Bogazici University - While it is well known that people regularly engage in simulations about their own and their group's future, our understanding of the mechanisms and the factors impacting future collective thoughts are not well understood. To understand future collective thoughts in relation to collective memories, we asked a diverse group of undergraduates to identify and date both the most important events in the nation's (Turkey) past and those simulated for the nation's future. Participants also rated the past and imagined events on valence, collective importance and transitional impact. We analyzed whether simulations are driven by what is deemed as most important in the past; whether the temporal distribution and valence of past and future public events differ and how sociopolitical identity indexed by voting behavior impacts these collective future projections. As in the episodic domain, collective memory and collective future thoughts may be governed by similar principles.

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12:00-1:30 PM (4130)

People Report "Pre-Traumatic Stress" Symptoms That Correlate with the Characteristics of Stressful Imagined Future Events. MEVAGH SANSON and HOLLY WILSON, The University of Waikato, MARYANNE GARRY, The University of Waikato - After a stressful event, people develop symptoms of Posttraumatic Stress Disorder (PTSD), which correlate with characteristics of their memory for that event. In some ways, remembering a past event is similar to imagining a future one. Could people develop these same symptoms before a stressful event-one they merely imagined experiencing in the futureand would those symptoms correlate with characteristics of their imagined event? We asked subjects to describe a deeply stressful event, either one they had imagined or one they remembered, rate its phenomenological characteristics, and report the severity of the PTSD-like symptoms they had experienced in relation to that event. Subjects reported "PreTSD" symptoms to a similar degree as PTSD symptoms. Moreover, many characteristics were correlated similarly with PreTSD symptoms and PTSD symptoms. These findings fit with the idea that how people remember a stressful event-not just that it happened-is central to the occurrence of PTSD symptoms.

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12:00-1:30 PM (4131)

Collective Memories Serve Many of the Same Functions as People's Autobiographical Memories. RYAN BURNELL, The University of Waikato, SHARDA UMANATH, Claremont

McKenna College, MARYANNE GARRY, The University of Waikato (Sponsored by Maryanne Garry) - People from the same country often hold shared, culturally-shaped stories about important events from that country's history-these stories are known as collective memories. Just as people's autobiographical memories shape their personal identity, collective memories help shape a collective's identity. But autobiographical memories also serve other functions-they direct people's behavior and are discussed in social settings to help forge relationships. To what extent do collective memories serve these directive and social functions for the collective? We asked subjects to rate both their autobiographical memories and their country's collective memories on identity, directive, and social functions. Our findings suggest that collective memories serve many of the same functions as people's autobiographical memories.

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12:00-1:30 PM (4132)

Fluency and Vividness of Episodic Future Simulations and the Propensity for Risky Behavior in Undergraduate Students. JEREMY MILLER and KATE MORRIS, Willamette University (Presented by Jeremy Miller) - Recent research suggests that individuals with decreased ability to mentally simulate future-oriented events are prone to risky behaviors like disordered gambling (Noël, et al., 2017). The current study attempted to extend this finding by looking at the relationship between fluency and clarity of mental simulation, and selfreported risky behavior. To analyze fluency of future and past oriented thoughts, participants were instructed to think about positive and negative events over four time periods (last year, last week, next week, next year), and write down as many events as they could come up with for each category (MacLeod & Byrne, 1996). For each time period, participants chose one event and created a detailed mental simulation of that event. Following mental simulation, participants rated the phenomenological experience of their simulation on a number of dimensions (e.g., availability of visual details). Participants also completed measures designed to assess sensation seeking (Arnett, 1994) and self-control (Tangney, Baumeister, & Boone, 2004). The findings of this study further elucidate the relationship between future oriented episodic simulation and risky behavior. Email: Jeremy Miller, millerj@willamette.edu

12:00-1:30 PM (4133)

Predicting Psychological Well-Being from Narrative Characteristics of Undisclosed Guilt and Shame Memories. NAZIKE MERT and ALI İ. TEKCAN, *Boğaziçi University* (Sponsored by Ali Tekcan) – Substantial research showed that expressive writing may alleviate emotional and physical impact of negative experiences. It has been suggested that cause and insight related content in event narratives predicted well-being (Pennebaker, 1993). The present study investigated the role of narrative characteristics of undisclosed guilt and shame memories in alleviating effects of these negative experiences. Seventy-one undergraduates wrote about either an undisclosed guilt memory, an undisclosed shame memory or a disclosed negative memory on three separate days within a week. Narratives were coded for meaning making, autonomy, growth and resolution; among these, only resolution predicted wellbeing. Moreover, having a closure about the event and lower negative affect predicted higher expectancy to regulate negative mood and higher self-compassion after one month. Lower negative affect was associated with lower psychological and physical symptoms.

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12:00-1:30 PM (4134)

A Tale of Two Cultural Life Scripts: Immigrants' Perception of a Normative Life. MÜGE ÖZBEK, ANNETTE BOHN, and DORTHE BERNTSEN, Aarhus University - Immigration is a significant cultural transition that may change people's views about a normative life. Here we examined influences of cultural and generational differences on cultural life scripts (normative life events) and subjective well-being of the 1st and 2nd generation Turkish immigrants in Denmark, compared with Danes. Specifically, 33 younger Turks and 33 younger Danes matched on demographics, and 47 older Turks provided 7 normative life events, reported the events' expected timing and valence and filled in well-being measures. Events were mostly positive and dated to the reminiscence bump period (between ages 10-30). The percentage of positive events across the lifespan and well-being ratings did not differ among groups. However, Turks provided less normative life scripts than Danes. These results highlight that although expected timing and valence of life script events are robust, event content is sensitive to cultural differences and more heterogeneous in Turkish immigrants in Denmark.

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12:00-1:30 PM (4135)

Memory Recency Modulates the Neural Correlates of Overt Autobiographical Memory Retrieval. ADRIAN W. GILMORE, ALINA QUACH, SARAH E. KALINOWSKI, and STEPHEN J. GOTTS, National Institute of Mental Health, DANIEL L. SCHACTER, Harvard University, ALEX MARTIN, National Institute of Mental Health - The degree to which the hippocampus is necessary for the retrieval of distant memories is a matter of ongoing debate. Neuroimaging support for sustained as compared to reduced involvement over time remains equivocal, which may be due in part to the content of memories changing as memories age. However, interpreting relevant findings is made difficult by the typical approach of using covert in-scanner autobiographical memory recall. In this experiment, participants engaged in 2-minute periods of continuous spoken recall while undergoing fMRI. Memories were cued from 3 different time periods (same day, approximately 1 year prior, or 5-10 years prior). Overt recall allowed modeling of varying event details throughout each trial, enabling separation of memory age and content. Temporally distant memories were associated with reduced activity in the posterior hippocampus as well as the parietal midline and inferior parietal lobule. These results favor the "standard" model of memory consolidation and

suggest that even when accounting for differences in retrieved content, hippocampal involvement in autobiographical recall changes over time.

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12:00-1:30 PM (4136)

Memory Reframing to Improve Wellbeing: Can Retrieval-Induced Forgetting Positively Reframe Memories of Negative Valence. JENNIFER L. BRIERE, St. Thomas More College & University of Saskatchewan, JANINNE COLLINS, University of Saskatchewan (Presented by Jennifer L. Briere) -*Memory reframing* (changing the content or quality of memory) may allow for positive reinterpretation of an experience, reduce distress, and direct future behaviour. Retrieval-induced forgetting (RIF) is a natural process that helps reframe memory to reduce irrelevant details and increase recall of relevant ones. It may be possible to use RIF to shift the remembered content and emotional valence of a negative event in a more positive direction. The purpose of this study was to evaluate a reframing retrieval-induced forgetting (RRIF) procedure where RIF was applied to cognitive reappraisals (i.e., a negative experience is re-evaluated by examining positive outcomes) and to positive memory details about an anxious university related experience. A significant RIF pattern of results was found (ps < .04). A significant positive shift in emotional valence of the negative details was also observed 1-week later (p = .005). The RRIF procedure may be an effective short-term intervention to adjust the remembered content and quality of negative memories and warrants further research.

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12:00-1:30 PM (4137)

Taking Stock of the Past: A Comprehensive Psychometric Evaluation of the Autobiographical Interview. AMBER W. LOCKROW and RONI SETTON, Montréal Neurological Institute, McGill University, SIGNY SHELDON, McGill University, GARY R. TURNER, York University, ROBERT NATHAN SPRENG, Montréal Neurological Institute, McGill University (Sponsored by Julia Spaniol) - The Autobiographical Interview (AI) is a widely used measure of autobiographical memory designed to assess characteristics of personal recollective experiences. Yet, despite its prominent position, its psychometric validity has yet to be fully demonstrated. Here we assessed the AI's inter-rater reliability, internal consistency, and convergent validity in a large sample of adults (N=293). High inter-rater reliability was observed for raters trained on the AI scoring protocol. Internal consistency, including stability of details between time periods, was moderate. Convergent validity, assessed using laboratory measures of episodic memory, semantic memory, and fluid cognition, was mixed with some predicted associations observed. Overall, episodic AI details were associated with episodic measures, but non-episodic AI details did not correlate with semantic measures as expected. The current findings suggest that the AI's standardized administration and scoring protocol ensures measurement consistency. However, weak convergence between AI performance and standard laboratory measures

of declarative memory raise significant questions about the construct of autobiographical memory and the nature of the cognitive processes tapped by the AI.

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12:00-1:30 PM (4138)

Studying Long-Term Autobiographical Memory Using Digital Technology. AIDEN WEST, The New School, CLINT MERCK, The New School for Social Research, GABRIANA BASILE and DIANA URIBE, The New School, WILLIAM HIRST, The New School for Social Research (Sponsored by Michael Schober) - Autobiographical memory has been studied longitudinally by very few researchers (Linton, 1972; Wagenaar, 1986). This study aims to fill this gap in both methodology and participant age by assessing long-term autobiographical memory both during the reminiscence bump and with a novel digital recording method. The researchers are recording their own memories daily through an online platform that has integrated both the event centrality and transitional impact scales (Berntsen & Rubin, 2006; Svob & Brown, 2013). This study will analyze the reminiscence bump during it, unlike Linton and Wagenaar. A self-testing phase will occur, and the time 2 variable will be recorded. With this, we can examine retention function and frequency of memories of specific qualities. This may allow us to both indicate precursors to autobiographical memories and learn further about autobiographical memory and its reasoning.

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12:00-1:30 PM (4139)

Homesickness and Autobiographical Memory in First-Generation Students. MARYJANE WRAGA and MATHENA ABRAMSON, Smith College - College students living away from home for the first time often experience homesickness. Previous research has shown that homesickness is related to an increased focus on autobiographical memories from home, as well as increased feelings of homesickness induced by these memories (Wraga et al., 2018). First-generation (FG) students, whose parents did not attend or graduate from college, may carry extra emotional, social, and financial burdens in college (Sy et al., 2011); therefore, they may be particularly hard hit by homesickness and its residual cognitive effects. In the present study we compared the impact of homesickness on autobiographical memories of FG and nonFG students. Participants generated autobiographical memories for 20 randomly presented word prompts. They then rated characteristics of the memories (including homesickness), as well as positive and negative emotions. Lastly, they completed a person-level homesickness scale. We ran a multi-level model analysis on all the data using a restricted maximum likelihood (RML) estimation. We found that several of the characteristics, and both types of emotions, predicted changes in homesickness ratings of autobiographical memories, but found no significant effect of FG status.

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12:00-1:30 PM (4140)

Contrasting the Effects of Decay and Interference on Recollecting Detailed Complex Events. AZARA LALLA and SIGNY SHELDON, McGill University (Sponsored by Ross Otto) - Learning complex events involves encoding both the central or gist-based aspects of the event as well as peripheral or item-based details. The objective of this study was to test whether central and peripheral details are susceptible to different forgetting mechanisms. Research indicates that peripheral but not central details are forgotten due to decay, the passage of time. Less is known about how details are affected by interference, forgetting that occurs from related information. We used a betweensubjects design to contrast the effects of decay and interference on what is remembered from complex memories. Participants encoded videos of events that had central and peripheral details. After encoding a video, participants in the interference group heard an interfering narrative and those in the decay group experienced an unfilled delay. Both groups recalled the videos immediately and after 24 hours. We scored the recollections for central and peripheral details. Linear mixed models revealed that the number of peripheral details predicted the number of central details recalled as function of group. These data suggest that decay and interference mechanisms distinctly alter how details are recollected from complex memories. Email: Azara Lalla, azara.lalla@mail.mcgill.ca

12:00-1:30 PM (4141)

Acquisition and Maintenance of Cognitive Training Effects in a Massive Online Dataset. ALLEN M. OSMAN, ROBERT J. SCHAFER, and NICOLE F. NG, Lumos Labs (Presented by Allen Osman) - Computerized cognitive training, including programs offered via online websites and apps, has been the focus of numerous studies. While randomized controlled trials have begun to shed light on the efficacy of such training, many questions remain. Among these are 1) the form of the dose-response relationship between training and cognitive outcomes and 2) the extent to which training effects are maintained over time. To address these questions, we analyzed a large observational dataset of nearly 750,000 individuals who underwent Lumosity online training and were assessed up to three times with the NeuroCognitive Performance Test (NCPT). For all demographic groups examined, a positive relationship was found between the amount of training between the 1st and 2nd assessments and improvements on the NCPT. The form of this dose-response function - both the rate and asymptote of improvement - differed across cognitive domains appraised by the NCPT. Examination of the NCPT at the third assessment found improvements to be maintained for months after training with only modest decay. Additional training between the 2nd and 3rd assessments was associated with small but significant improvement beyond the original training effects. Email: Allen M. Osman, allen.osman@gmail.com

12:00-1:30 PM (4142)

Examining the Impact of Specific Game Factors on Game-Based Cognitive Training: A Meta-Analysis. EVAN T. SMITH, *University of Texas at Dallas*, CHANDRAMALLIKA BASAK, *University of Texas at Dallas* (Sponsored by Chandramallika

Basak) - Past reviews of video game based cognitive interventions have classified games into a small number of broad categories such as "Action" or "Strategy" games. However, these genres encompass a wide range of games with highly varying gameplay features. The present meta-analysis addresses this potential confound in video game training by examining the training-related gains in cognition with respect to specific gameplay factors (e.g., player perspective, time pressure, controllable objects, spatial movement style). Separable clusters of gameplay factors were found to facilitate gains to attention (e.g., first-person perspective), executive function (e.g., time pressure), and memory (e.g., multiple controllable objects) outcome constructs. Factors which facilitated transfer to attention and executive function partially corresponded to the "Action" and "Strategy" genres respectively, whereas factors found to facilitate transfer to memory did not coincide with genres used in previous interventions. The implications of these results are discussed, with specific recommendations for future video game training studies.

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12:00-1:30 PM (4143)

Training Updating with a Focused Video Game. ASHLEIGH WELLS and RICHARD E. MAYER, University of California, Santa Barbara, ANDREW MACNAMARA and JAN PLASS, New York University, BRUCE HOMER, City University of New York (Sponsored by Richard Mayer) - This study examined whether playing a focused video game designed to train the executive function skill of updating would train the skill after two hours of gameplay. In the game, players are trying to free sea creatures from an angry octopus who has trapped them in bubbles. The bubbles become occluded and the players are required to remember the type of creature and color of the bubble. The number of creatures, colors, and covered bubbles increases as the game progresses. Fifty-eight undergraduates played the game or an active control game for two hours. Results showed the game group did significantly better on the n-back task than those in the control group [d-prime: F(1, 55)= 4.36, p = .041, d = .54; number correct: F(1, 55) = 6.80, p= .01, d = .68], as hypothesized. These results contribute to a cognitive theory of game-based skill training. Email: Ashleigh Wells, akwells@ucsb.edu

12:00-1:30 PM (4144)

Interleaved in One Dimension; Blocked in Another: The Case of Learning German Verb Conjugation Skills. TREVOR HARRISON, STEVEN C. PAN, JORDAN A. BRABEC, SASKIA GIEBL, ELIZABETH LIGON BJORK, and ROBERT A. BJORK, *University of California, Los Angeles* (Sponsored by Robert Bjork) – Prior research has shown that alternating between stimulus categories (interleaving) can benefit learning. However, exposure to multiple consecutive instantiations of an implicit rule (blocking) can also be helpful. We explored how both methods might influence a difficult language learning task: mastering verb conjugations. In our study, one group of participants learned six different conjugations of one German verb (e.g., lege, legst, legen) before switching to another verb. Another group learned six different verbs with

the same conjugation (e.g., lege, fege, hege) before progressing to another conjugation. Thus, one group used blocking by verb and interleaving by conjugation, whereas the other group used the reverse. Participants completed 1 study and 4 recall trials per verb. We assessed learning on a retention test (for learned verbs) and a transfer test (define novel verbs using the previously learned rules). Although there were no group differences for recall, blocking by conjugation and interleaving by verb yielded better transfer performance. Followup work is examining different language materials. Overall, these results illustrate a case wherein opposing combinations of interleaving and blocking yield different results.

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12:00-1:30 PM (4145)

Short Interventions, Large Effects: A Critical Reappraisal of the Meta-Analytic Literature on Brain Training, Video Gaming, Mind-Set, and Stereotype Threat. DAVID MOREAU, University of Auckland - Recent popular areas of research in psychology suggest that short interventions can have profound effects on human cognitive abilities. In particular, the study of brain training, video gaming, mind-set and stereotype threat all include claims that low-cost, non-invasive manipulations of beliefs or of the environment can greatly affect individual performance. Here, I provide a critical reappraisal of this literature, focusing on a new analysis of meta-analytic findings in these four areas of research. Using mixture modeling, I show that effect size distributions in these fields appear to be clustered, suggesting that multiple underlying distributions may be contributing to each overall distribution. I further demonstrate that, although not unique to these fields, the multimodal characteristic of these meta-analyses is not typical in psychology, using a number of meta-analyses published in top-tier journals as comparison. Together, these results indicate that caution is required when interpreting findings from these research areas, especially when they influence large-scale policies. More generally, the present study calls for healthy, constructive skepticism in evaluating claims of cognitive enhancement following interventions.

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12:00-1:30 PM (4146)

The Effects of Retrieval Practice on Analogical Problem Solving. DANIEL CORRAL, SHANA K. CARPENTER, KYLE J. ST. HILAIRE, CHRISTINA HICKMAN, EMMA REESE, and CHELSIE BENSHOOF, Iowa State University -A particularly robust finding is that material is better learned when it is retrieved than when it is re-studied. However, other studies show a seemingly contradictory finding in that studying worked examples leads to superior problem solving than retrieving a problem's solution. One critical difference between these literatures is that studies on retrieval practice often assess learning by using items that can be answered through rote memorization, whereas studies on problem solving require learners to transfer their knowledge from prior examples to novel scenarios. This latter process requires analogical transfer, and it is therefore unclear whether retrieval practice enhances learning in these cases. We examine this question and report a study wherein subjects were shown novel, analogous scenarios. Some subjects were asked to solve these scenarios and were shown the solution after each response, whereas others were only asked to study each scenario and its solution together. All subjects were then given a novel scenario to solve. The results revealed no performance differences between conditions, suggesting that problem-solving practice (compared to studying examples) did not significantly benefit analogical transfer. Email: Daniel Corral, dcorral@iastate.edu

12:00-1:30 PM (4147)

Delayed Effects of Semantic Blocking on Picture Naming: Testing the Effortful Retrieval Hypothesis. ABHIJEET PATRA, Moss Rehabilitation Research Institute, HILARY J. TRAUT, University of Colorado, Boulder, MACKENZIE STABILE, University of Connecticut, ERICA L. MIDDLETON, Moss Rehabilitation Research Institute - Retrieval practice, or the retrieval of information from long-term memory, is well known to confer robust learning, particularly when retrieval is effortful. Recent work has shown effortful retrieval effects in spoken word production (e.g., picture naming) in people with stroke-induced aphasia (PWA). However, a theoretical explication of such effects is lacking. The current study examined whether enhanced semantic competition when naming objects can confer later benefit to naming performance in PWA. In a within-subject design, 6 PWA practiced naming repeating sets of pictures drawn from the same category (e.g., dog, kangaroo, snake, horse, elephant, penguin) versus from multiple categories (e.g., cat, egg, hat, tree, bell, chair) with all trials ending in correct-answer feedback. Group analyses on naming performance during training and at a later (1-day) naming test suggest enhanced semantic competition during training can confer later benefit to naming performance. Relevance to theories of word production will be discussed. Email: Abhijeet Patra, abhijeet.patra14@gmail.com

12:00-1:30 PM (4148)

When Is Test-Potentiated Learning Item-Specific Versus Generalized? CAROL M. BOLTE, University at Albany, SUNY, JAMES H. NEELY, University at Albany, SUNY (Sponsored by James Neely) - The current experiments used short (< 1 min) and long (24-hour) retention intervals in the Test-Potentiated Learning (TPL) paradigm to investigate pair specific versus generalized testing effects (TEs) using weakly related English word pairs. The design of the present experiments improved the design used by Cho, Neely, Crocco, and Vitrano (2017), who used Swahili-English pairs. The present design allows for (a) an assessment of both between- and within-subjects pair-specific vs. generalized TEs within the same experiment and (b) better controlled comparisons of the pair-specific and generalized TEs. There was no TE at the short retention interval. At the long retention interval, the TE for tested pairs studied before and after the review test was greater than the generalized TEs obtained for (a) untested pairs studied before and after the review test and (b) untested pairs that were only studied after the review test. Thus, a pair-specific TE occurred, unlike in

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Cho et al. (2017). The potential reasons for why weakly related English word pairs show pair-specific TEs but Swahili-English pairs do not are discussed.

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12:00-1:30 PM (4149)

Partial Retrieval Potentiates New Learning for Semantically Related Word Pairs in a Negative Transfer Paradigm. MONIQUE CARVALHO and HARVEY MARMUREK, University of Guelph (Sponsored by Harvey Marmurek) -Testing a studied list enhances the encoding and retrieval of a new list (Chan et al., 2018; Sundqvist et al., 2017). There is inconsistency in findings as to whether testing part of a studied list does (Wahlheim, 2015) or does not (Tulving & Watkins, 1974) potentiate new learning. The present research compared the effects of partial list testing of an A-B word pair list on the learning of a second A-D negative transfer list (same cue words as the initial list paired with new target words) in conditions where the word pairs were semantically related (Wahlheim, 2015) or unrelated (Tulving & Watkins, 1974). We found that potentiation by partial testing relative to mere restudy occurred only for the learning of new semantically related word pairs. The limit on retrieval potentiation may be constrained by the overall level of learning which is higher for related word pairs. Email: Monique Carvalho, mcarvalh@uoguelph.ca

12:00-1:30 PM (4150)

Test-Enhanced Procedural Learning. DAVID B. SMITH and SHAWN ELL, University of Maine - The benefit of testing on the retention of learned material has typically been investigated using tasks dependent upon an explicit, declarative learning system. It is unclear if retrieval has similar benefits for tasks dependent upon an implicit, procedural learning system. We report the results of an experiment investigating this issue using the weather prediction task - a task argued to depend upon procedural learning for optimal performance. Participants were trained to learn to associate stimuli with one of two outcomes in either a test or study condition. In the test condition, participants were instructed to generate the outcome that was most likely to be associated with each stimulus and were provided corrective feedback. In the study condition, participants were instructed to study the stimulus-outcome pairings. Performance was evaluated either immediately or 48 hours later. There was an accuracy advantage in the test condition, 48 hours after training, suggesting that testing also enhances retention for tasks that may be learned by an implicit, procedural learning system. These results fill a critical gap in the literature and advance the field by further characterizing the conditions that promote retention.

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12:00-1:30 PM (4151)

Does the Use of Tests During Class Time Improve Academic Grade? MATHILDE LAMOTTE, MARIE IZAUTE, and CÉLINE DARNON, *Clermont Auvergne University* – The aim of this study is to explore the effect of test on learning in a real classroom context in a French university. Two groups of students who took the same class with the same teachers and both the

same exams were compared (N=267). In the test condition, students took tests at the end of each class session (spring semester 18-19). In the control (i.e. no test) condition, they did not (spring semester 17-18). The content of the class, the exam questions and the teachers were identical for both groups. We hypothesized a beneficial effect of test on final grades. We also collected students' social class (parents' highest academic degree) to test whether it would moderate the beneficial effect of test. We ran a within-subject ANOVA with exams as withinsubject variable and experimental condition and social class as between-subject variables, the initial level (i.e. previous grade obtained on this topic), as covariate. The analysis revealed that students in the test condition got higher grades than in the control condition. Social class had a positive effect on grade but did not interact with the test condition, suggesting that tests increased academic grade both for higher and lower social class students.

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12:00-1:30 PM (4152)

Will Students Self-Test When Made Aware of the Benefits? KALIF E. VAUGHN, Northern Kentucky University - In Experiment 1, I had participants learn Eskimo-English word pairs in a self-regulated learning environment. Participants could study, test, or drop items as they wished. Participants exhibited a preference for self-testing over studying. In Experiment 2, I told a random subset of participants about the benefits of retrieval practice and encouraged them to self-test. Participants receiving these instructions did not self-test at statistically higher rates compared to those not receiving these instructions; however, participants once again self-tested more than restudied (regardless of instruction). Despite higher rates of self-testing, participants tended to believe that studying was more effective for learning. These faulty beliefs persisted even for the participants that were told about the benefits of retrieval practice. In contrast, participants thought that self-testing was more fun than studying. Thus, learners may self-test not because of a belief that self-testing is effective, but because they find selftesting more enjoyable than restudying. To alter study behavior, telling participants about the benefits of retrieval practice may be less effective than finding ways to make retrieval practice naturally rewarding.

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12:00-1:30 PM (4153)

Testing Effects for Self-Generated Versus Experimenter-Generated Questions. SARAH J. MYERS (Graduate Travel Award Recipient) and MATTHEW G. RHODES, *Colorado State University* (Sponsored by Matthew Rhodes) – Prior research indicates that retrieving information improves long-term learning relative to restudying that information. Accordingly, it is often recommended that students use testing as a study strategy. However, in most prior work, the experimenter provided test materials, making it unclear whether testing benefits would occur if students created the test questions. In Experiment 1 of the present study, all participants generated test questions over passages; half then answered these questions at a delay (ensuring retrieval) and half generated questions and answers simultaneously. Contrary to predictions, participants who answered questions simultaneously performed better on a final test than those who generated questions. In Experiment 2, participants either generated and answered test questions, answered experimenter-provided questions, or restudied. Those who generated questions exhibited the poorest final test performance. Thus, these data suggest that testing benefits may be less likely to accrue when students must generate their own questions.

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12:00-1:30 PM (4154)

Constructive Retrieval by Prompted Recall: Exploiting the Benefits of Retrieval Practice and Elaboration. TINO ENDRES (Graduate Travel Award Recipient) and ALEXANDER RENKL, Albert-Ludwigs-Universität Freiburg, SHANA K. CARPENTER, Iowa State University (Sponsored by Shana Carpenter) - It is a robust finding that retrieval practice fosters memory of newly learned contents (testing effect). However, in most cases, retrieval has been known to enhance memory but its effects on more complex comprehension are not as clear. When learners aim to improve their comprehension, they usually engage in constructive learning activities such as elaboration. We combined retrieval practice and elaboration to observe whether the benefits of both procedures could be combined. We varied the two factors retrieval practice and elaborative prompts in a 2x2 between-subjects design, with a control group (n=154). Undergraduate students learned from a video-recorded lecture. In a one-week delayed posttest, we assessed factual knowledge and comprehension. Retrieval practice produced better performance than restudy in factual knowledge. Elaborative prompts improved factual knowledge and comprehension. The combined elaboration and retrieval group outperformed the retrieval practice conditions on comprehension without harming factual knowledge. The combined retrieval condition had comparable comprehension scores to the elaboration condition (Bayesian analysis). This study shows the benefits of combining elaboration and retrieval practice.

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12:00-1:30 PM (4155)

Does Self-Efficacy Contribute to the Retrieval Practice Effect? ANDREA N. FRANKENSTEIN, University of Illinois at Chicago, ALLISON M. SKLENAR, University of Illinois at Chicago, MATTHEW P. MCCURDY, University of Illinois at Chicago, PAULINE URBAN LEVY and ERIC D. LESHIKAR, University of Illinois at Chicago (Sponsored by Eric Leshikar) - Research on retrieval practice has focused on cognitive mechanisms underlying this memory benefit (e.g., elaborative retrieval, transfer-appropriate processing); however, little research has explored social-cognitive factors that may contribute to the retrieval practice effect. In this experiment we measured the extent self-efficacy, which is an individual's belief or confidence in their ability to accomplish a task, may contribute to the memory benefit due to retrieval practice. In this experiment, participants watched lecture videos, engaged in either retrieval practice or re-study, and returned 48 hours later

to complete a final test. Self-efficacy was measured three times: at baseline, halfway through the learning procedure, and at the end of learning. The results showed a typical retrieval practice effect: those in the retrieval practice group scored significantly higher on the final test. We also found that participants' selfefficacy increased over time and that their change in self-efficacy predicted their overall memory performance. The current study contributes to the literature by investigating a previously understudied relationship between retrieval practice, self-efficacy, and memory.

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12:00-1:30 PM (4156)

Does Testing Enhance Mediation in Now-("Cow")-Milk Paired-Associate Learning? DEANA VITRANO and JAMES H. NEELY, University at Albany, SUNY (Sponsored by Chi Shing Tse) - The Mediator Effectiveness Hypothesis (MEH) states that in cue-target paired-associate learning, testing enhances target recall by strengthening effective mediators. The MEH has been supported with Swahili-English word pairs and explicit mediation instructions (Pyc & Rawson, 2010), but not with English word pairs and no mediation instructions (Cho et al., 2017). Here we evaluate the MEH under spontaneous mediation conditions using English word pairs constructed similarly to Pyc and Rawson's pairs. Pyc and Rawson's Swahili cues and English mediators were phonologically related (mashua-"mast"), and the English mediators and targets were semantically related ("mast"-boat). Our English word pairs (e.g., now-milk) followed this pattern (now-"cow"; "cow"-milk). The cue-target word pairs were studied 3 times and after each study list were restudied or were tested. Two days later, a final test was given for both cue-target and mediator-target recall. Contrary to the MEH, which predicts that the testing effect for target recall should be greater when the mediator is recalled, the testing effects for target recall were the same whether the mediator was or was not successfully recalled.

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12:00-1:30 PM (4157)

Factors Affecting Retrieval Induced Forgetting and Retrieval Induced Facilitation. KIMBERLY WEAR, *High Point University* – Retrieval practice can enhance long-term memory for tested material (testing effect), but it has also been shown to impair memory for nontested material (retrieval induced forgetting; Anderson, Bjork, & Bjork, 1994). However recent research using classroom materials rather than categorized lists has demonstrated facilitation for related nontested material (i.e., Chan, 2009). While level of integration seems to be a critical factor, other factors may also be important. The current study replicated findings that the delay between retrieval practice and final test was critical, but also found that the type of feedback provided during retrieval practice played an important role. Email: Kimberly Wear, kwear@highpoint.edu

12:00-1:30 PM (4158)

When Do True/False Questions Produce the Testing Effect? EYLUL TEKIN, OYKU UNER, and HENRY L. ROEDIGER, *Washington University in St. Louis* (Sponsored by Jonathan

Peelle) - It is unclear whether true/false questions yield a testing effect as other test formats. Previous research in our lab revealed that answering true/false questions about text passages did not enhance long-term retention on a short answer final test compared to a control condition in which students were asked to reread and type true statements presented. In the current experiment, students read eight passages and either took a true/ false quiz (true/false), typed true statements (type-control), or only reread true statements (reread-control). The final test consisted of short answer questions and true/false questions identical to quiz questions. The true/false group performed better than the reread-control group, demonstrating the testing effect; however, their performance was not statistically different than the type-control group. A second experiment was conducted to replicate these results and test whether the testing effect is present when the true/false questions on the final test are not identical to guiz questions.

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12:00-1:30 PM (4159)

Adaptive Cuing Selectively Facilitates Error Correction. JOSHUA FIECHTER, Williams College - In adaptivecues retrieval practice (ACRP), learners are given multiple opportunities within a single trial to 1) attempt retrieval of a target and then 2) view a letter of the target if retrieval fails. ACRP is at least as effective as standard testing with feedback (Fiechter & Benjamin, 2019) if not more so (Finn & Metcalfe, 2010). The present experiment evaluated the effect of ACRP for learning of two kinds of stimuli: related word pairs, which benefit from retrieval errors followed by feedback, and unrelated word pairs, which do not (Huelser & Metcalfe, 2012; Grimaldi & Karpicke, 2012). Participants completed an initial study phase, then engaged in restudy, tests with feedback, or ACRP. A final test occurred 24 hours later. Relative to restudy, ACRP and testing with feedback were both effective for related pairs, but only ACRP was effective for unrelated pairs. These findings suggest that ACRP supports error correction under conditions in which standard testing plus feedback is minimally effective. Email: Joshua Fiechter, josh.fiechter@gmail.com

12:00-1:30 PM (4160)

Sorry, Am I Intruding? Pretests, Posttests and False Intrusions. KELSEY K. JAMES and BENJAMIN C. STORM, *University of California, Santa Cruz* – Taking a test either before or after the encoding of to-be-learning information can enhance the learning of that information, phenomena referred to as the pretesting effect and the testing effect, respectively. In the current study, participants read two passages. One passage was preceded by a true-false pre-test, whereas the other was followed by a true-false post-test. After a brief delay, participants were given a cued-recall test on the pretested/post-tested information, as well as other information that was not pretested or tested. Intrusion rates were also analyzed to examine the extent to which participants recalled false information encountered on the earlier pre-test/post-test. Data collection is still underway, but preliminary results suggest that both types of test can

enhance learning and that false information encountered on a post-test may be more likely to be recalled at final test than false information encountered on a pre-test.

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12:00-1:30 PM (4161)

Curiosity Mediates the Relationship Between Confidence in Errors and Learning. EMILY TOWNER, University of California, Los Angeles, JANET METCALFE, Columbia University (Sponsored by Janet Metcalfe) - When people make errors, they are most likely to learn from those errors if they had been confident in their original answer. Could curiosity explain this 'hypercorrection effect'? We investigated the relationship between confidence, curiosity, and learning under different feedback conditions. Participants answered 127 general information questions and rated their confidence in their answer. On half of the trials, participants were then given right/wrong feedback about whether they were correct or incorrect. On the other half, no feedback was provided at this stage. Participants then rated how curious they were to find out the correct answer. Then, subjects were shown the correct answers to a subset of questions and were finally retested on the questions. Curiosity mediated the hypercorrection effect-a multilevel mediation analysis showed that curiosity mediated a portion of the effect of confidence on learning. However, telling people they were wrong did not increase their curiosity to find out the correct answer. Furthermore, our results suggest that people have some insight into whether they are correct or not over and above their confidence rating.

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12:00-1:30 PM (4162)

A Novel Study of Hypermnesia. ABIGAIL C. DOOLEN and GABRIEL A. RADVANSKY, University of Notre Dame (Sponsored by Gabriel Radvansky) - Memory can actually increase (hypermnesia) across repeated tests without any further study (e.g., Erdelyi & Kleinbard, 1978). This finding has led to the widespread use of testing to improve memory in classrooms. The current experiment examined hypermnesia for popular novels. Thirty-five participants took two tests (separated by 24 hours) on a novel they had previously read. The tests had identical questions presented in a different order. Overall, people performed better on the second test (p = 0.002). This effect occurred regardless of how long ago the book was read ($r^2 = 0.01$). However, only memory for person and object increased (ps < 0.001). Memory did not change for what, location, absolute time, relative time, why, and how. The current study demonstrated that testing can improve memory years after initial learning, but not all types of memory benefit from testing without restudy.

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12:00-1:30 PM (4163)

Retrieval Potentiates New Learning by Increasing List-Separation, Not Organisation. SHAUN PAUL BOUSTANI and CALEB OWENS, *The University of Sydney* (Sponsored by Sally Andrews) – Previous retrieval attempts facilitate greater learning of subsequent materials (Chan, Meissner, & Davis, 2018). It has been argued that test-potentiated new learning (TPNL) occurs when retrieval potentiates new learning via increased inter-list conceptual organisation and integration. In a series of experiments the current study examined this account. An interpolated-testing paradigm was used where original studying of word-lists was followed either by retrieval, restudy, categorical judgements - which increase conceptual organisation, or list-discriminations - which increase listseparation. Following a lag, a final new word-list was studied and retrieved. The findings replicated the traditional TPNL effect - retrieval potentiated greater new learning of the final list than restudy. It was also observed that previous listdiscrimination attempts produced greater new learning than restudy, but categorical judgements did not. The results suggest that although inter-list integration and conceptual organisation may be more likely during retrieval, this is not why testingpotentiates new learning. Rather more general list level effects, such as list-separation, are more likely mechanisms.

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12:00-1:30 PM (4164)

Reducing the Number of Retrieval Opportunities Reduces the Magnitude of the Forward Testing Effect. SARA D. DAVIS and DANIEL J. PETERSON, Skidmore College - Retrieval practice has long been understood to create powerful backward effects of testing. A more recent area of research has identified that testing can also enhance new learning, a phenomenon referred to as the forward testing effect (FTE). However, little is known about whether the magnitude of this effect depends on the amount of the information tested. Prior research has used tests that require retrieval practice for all original learning items. In two experiments, we manipulated the number of original learning items tested in order to determine the impact of retrieval practice dose on the magnitude of the FTE. In Experiment 1, in-lab participants studied four lists of weakly related cue-target pairs, and were either tested on or restudied 10%, 50%, or 100% of the items in each list.Experiment 2 was similar to Experiment 1, but included only the 10% and 100% conditions, and participants completed the experiment online. In both experiments, increasing the amount of items tested moderately increased the magnitude of the FTE. This finding has important applied implications, as teachers and students do not frequently interpolate exhaustive retrieval practice during learning.

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12:00-1:30 PM (4165)

Using Cognitive Science and Technology to Enhance Financial Education. SEAN H.K. KANG, University of Melbourne, LUKE G. EGLINGTON, University of Memphis, XINYI LU, University of Waterloo, BRENDAN A. SCHUETZE, University of Texas, Austin, JIMENA HUACO and TANJA M. HINTERSTOISSER, Champlain College – Financial literacy is an important life skill, yet the impact of financial education has often been found to be modest. We conducted a field experiment to assess the effectiveness of a post-instruction intervention using a smartphone app that incorporated cognitive science principles aimed at improving learning. College students who completed peer coaching on the topic of credit used the smartphone app in one of three practice conditions: control (no practice), massed, or distributed retrieval practice with elaborative feedback. On a final transfer test ~ 5 months later, students who engaged in distributed retrieval practice outperformed those in the control and massed practice conditions. Given the ubiquity of smartphones today, the results highlight the potential of harnessing easily accessible technology as learning tools to augment retention and transfer.

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12:00-1:30 PM (4166)

Context Variation and Retrieval Practice Both Enhance Subsequent Recall of Information, but Are Their Effects Additive? MEGAN N. IMUNDO, STEVEN C. PAN, INEZ ZUNG, ROBERT A. BJORK, and ELIZABETH LIGON BJORK, University of California, Los Angeles (Sponsored by Elizabeth Bjork) - Students often choose to study in one favorite place, but research demonstrates benefits of restudying in a context that differs from that of initial study (e.g., Smith, Glenberg, & Bjork, 1978). We examined whether the effectiveness of retrieval practice as a learning event is also enhanced when occurring in a context different from the initial study context. Participants studied a 36-word list and then, two days later, either restudied or attempted to recall those words in the same or a new location. Then after two more days, all participants completed a final recall test in a third, neutral location. Replicating Smith et al.'s findings, restudying in a new location was beneficial, but that benefit was minimal when the words were tested instead of restudied. We interpret these findings as suggesting that testing enhances episodic distinctiveness in a way that restudying does not, even when testing occurs in a context that matches the study context.

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12:00-1:30 PM (4167)

How Do Students and Educators Interpret Student Evaluations of Teaching? SARAH UMA TAUBER, ADDISON L. BABINEAU, and KATHERINE P. NEELY, Texas Christian University (Presented by Sarah Tauber) - A growing area of research is dedicated to determining how student evaluations of professors are interpreted. To add to this literature, we investigated how quizzing and the magnitude of a professor's ratings impact their interpretation. Quizzing typically enhances learning but can also make a class more challenging. Thus, quizzing may differentially impact students' and educators' interpretations of student evaluations, and it may interact with the magnitude of a professor's ratings. To explore these issues, students and college-level educators viewed a student evaluation for a fictional professor. The fictional professor had ratings above or below average and gave quizzes or did not. Participants made several judgements of teaching quality. Surprisingly, there were minimal differences between judgements made by students and educators. As important, whereas the magnitude of the professor's ratings substantially impacted judgments,

quizzing did not. Thus, interpretations of student evaluations may not adequately incorporate information about a professor's pedagogical decisions.

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12:00-1:30 PM (4168)

Testing Potentiates New Learning by Changing Strategy and Increasing Test Expectancy. KRISTA MANLEY, JASON C.K. CHAN, and DAHWI AHN, Iowa State University - Interpolated testing can potentiate new learning. We investigated whether this forward benefit of testing persists if interpolated testing stops "prematurely." In a list learning paradigm, subjects either took a recall test after every list (Always tested: T-T-T-T-T), took no recall test until the final list (Not tested: S-S-S-S-T), or took a recall test after only each of the first three lists and the final list (Early tested: T-T-T-S-S-T). In addition, half of the subjects answered a test expectancy question prior to studying each list. Results showed that the forward testing effect in the early tested condition was above half the magnitude as that in the always tested condition. Metacognitive indicators, including test expectancy and clustering scores during recall, significantly predicted recall performance during the final test. These results are consistent with the idea that testing potentiates new learning due to a change in encoding/retrieval strategies. Email: Jason C.K. Chan, ckchan@iastate.edu

12:00-1:30 PM (4169)

Effects of Literal and Conceptual Item Repetition on Transfer in an Authentic Learning Environment. DONALD J. FOSS and JOSEPH PIROZZOLO, University of Houston - Across two semesters, each with two sections of a Methods class, college students (total N = 298) were repeatedly tested on a set of 16 topics (e.g., self-selection as a confound, external validity) across four hour-exams and a final exam. Half of the test items were in multiple-choice (MC) format and half in short-answer (SA) format. Orthogonal to the test format, half the experimental items were repeated identically across the first four exams (the Constant items), while the other half repeatedly tested a construct (e.g., external validity) but with different exemplars on each of those exams (the Variable items). The Constant and Variable items were counterbalanced across the study, as was the test format (MC, SA). The final exam tested both old items and, importantly, new exemplars of each of the 16 topics in order to examine whether variable or constant repetition would lead to better performance-that is, to better transfer-and whether the amount of transfer would be affected by the type of test: recognition (e.g, multiple choice) or recall (e.g., short answer). Email: Donald J. Foss, dfoss@uh.edu

12:00-1:30 PM (4170)

How the Timing of Feedback Affects Learning. HANNAH HAUSMAN and MATTHEW G. RHODES, *Colorado State University* (Sponsored by Matthew Rhodes) – The present experiments investigated when and why feedback should be provided. We predicted that immediate feedback is necessary following errors so it can be linked to the correct answer, creating a mediated retrieval path. Delayed feedback should be more effective following correct answers by creating a spaced

study opportunity. Participants viewed a cue (*swim*), guessed the target (*float*), and received either immediate or delayed corrective feedback. On a final test, participants were shown either the cue (Experiment 1) or their original guess (Experiment 2) and recalled the correct answer. Immediate feedback was better following incorrect guesses, but delayed feedback was better following correct answers (Experiment 1). Contrary to the mediation hypothesis, immediate feedback following errors did not strengthen the link between the initial error and the correct answer (Experiment 2). Therefore, immediate feedback likely enhances error correction via a mechanism that does not involve retrieval via the original guess.

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12:00-1:30 PM (4171)

Examining the Effectiveness of Retrieval Practice Under Performance Pressure During a Final Test. CAROLINE BYRD HORNBURG, GARRETT M. O'DAY, and JEFFREY D. KARPICKE, Purdue University - Recent research has pointed to a potential boundary condition of retrieval practice by demonstrating a reduction in the retrieval practice effect when high-stakes quizzes are used during learning. In educational settings, tests are typically far more stressful for students than studying, but no experimental research has examined whether low-stakes retrieval practice is successful at reducing the pressure that students frequently feel during exams. In the present experiment, college students studied educationallyrelevant passages by either reading them or by answering practice questions with feedback. One week later, students were tested under neutral or pressure-inducing conditions. Retrieval practice not only improved test performance on both verbatim and inference short answer questions but also reduced the pressure students reported feeling during the test. Thus, lowstakes quizzes may be an effective strategy for teachers and learners to both boost test performance and reduce test anxiety. Email: Caroline Byrd Hornburg, chornburg@purdue.edu

12:00-1:30 PM (4172)

The Effects of Prequestions Versus Learning Objectives on Lecture-Based Learning. KYLE J. ST. HILAIRE and SHANA K. CARPENTER, Iowa State University (Sponsored by Shana K. Carpenter) - Answering test questions before a learning episode (prequestions) enhances that learning; however, this benefit tends to be specific to material from the prequestions and does not extend to other, non-prequestioned material. Much evidence supports the learning benefits of prequestions, but it remains unclear whether this benefit depends on answering the prequestion, or simply being pre-exposed to the material. In the current study, prior to viewing a video-recorded lecture, participants either answered prequestions (Prequestion Group), read analogous learning objective statements (Learning Objectives Group), or simply viewed the video lecture without any pre-exposure to the material (Control Group). A subsequent posttest assessed both prequestioned and non-prequestioned material, showing that the Prequestion Group performed better than the Learning Objectives Group, and both groups scored significantly higher on the prequestioned material compared to

the Control Group. This finding suggests that pre-exposure to the material enhances learning, but that answering prequestions provides the greatest benefit.

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12:00-1:30 PM (4173)

How Are Students Really Studying for Their Exams? Using Experience Sampling to Examine Daily Study Behavior. OYKU UNER, EYLUL TEKIN, RESHMA GOURAVAJHALA, FRANCIS T. ANDERSON, MARK A. MCDANIEL, and HENRY L. ROEDIGER, Washington University in St. Louis (Sponsored by Henry L. Roediger) - Students do not often report using effective study strategies. However, past surveys are limited, as they do not assess daily study behavior for an actual course; instead, they ask students to report on 'general' study habits. To address these issues, we examined daily study behavior in a college statistics class using experience sampling. Students completed brief surveys, once every evening, for seven days leading up to each of their five exams. We asked whether students studied in the past 24 hours, and if so, what strategies they used and for how long. We also surveyed a variety of contextual factors, such as grade expectation and satisfaction. Further, we collected motivation, self-efficacy, and math anxiety measures, as well as other participant characteristics (e.g., ACT scores). Overall, students tended to use non-generative strategies (e.g., rereading notes), rather than more elaborative strategies or self-testing. Using non-generative strategies predicted exam scores, whereas using the more effective strategies did not. Given what we know about good study behavior for longterm retention, steps must be taken to help students use better strategies more frequently and more effectively. Email: Oyku Uner, uner@wustl.edu

12:00-1:30 PM (4174)

Effects of Pretesting on Improving Course Performance in Online and Face-to-Face Classes. LISA D. BLALOCK and GABRIELLE HARRIS, University of West Florida - Does pretesting positively affect subsequent learning? Prior research by Little & Bjork (2016) indicates taking a multiple-choice (MC) pretest can help students recall related information on a future test. However, this benefit has not been examined in an online (OL) learning environment. We examined the effectiveness of pre-testing on learning across a 4-chapter unit in 2 sections of Memory & Cognition, one face-to-face (F2F) and one fully OL. Students who agreed to participate in the study in each section were randomly assigned to either the pre-quiz (answered 8 MC questions) or study questions (studied questions only without answer options) conditions. At the start of each chapter, participants completed a pre-quiz/study question online survey. After the chapter, all students took an 8 MC quiz. We also examined final unit exam performance, providing a longer term look at the benefits of pretesting. We found an overall benefit of pre-testing in both classes, with the OL students performing better overall compared to the F2F class. However, there was no significant interaction, suggesting pre-testing equally benefits students across instructional methods in a real-world educational environment.

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12:00-1:30 PM (4175)

A Comparison of Blocked and Interleaved Learning for Category Induction for Verbal and Pictorial Stimuli. MIRI BESKEN and ELIF CEMRE SOLMAZ, Bilkent University (Presented by Miri Besken) - The current study compared category induction performance through blocked and interleaved learning, using verbal (Experiment 1) and pictorial (Experiment 2) stimuli. Participants were assigned to one of three conditions at learning phase: blocked, interleaved, and semi-interleaved learning. In blocked learning, participants studied four exemplars of the same category within the same trial, and categories were blocked across trials. In interleaved learning, participants studied one exemplar from four different categories within the same trial, and categories were interleaved across trials. In semi-interleaved learning, participants studied four exemplars of the same category within the trial, but categories were interleaved across trials. At test, participants were presented with old and novel exemplars of the categories they studied and asked to identify the category. Both Experiment 1 and 2 revealed that participants had the highest test performance in the semi- interleaved learning condition. Learning similarities within the same trial and learning differences across trials might lead to the most optimal learning strategy for category induction, regardless of the type of stimuli used.

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12:00-1:30 PM (4176)

Mathematically Modeling the Optimal Desirable Difficulty. PHILIP I. PAVLIK, JR., University of Memphis, MENG CAO and LUKE G. EGLINGTON, University of Memphis - Prior work (Pavlik & Anderson, 2008) has estimated optimum practice schedules, typically assuming that a spacing effect existed. This efficiency-based method determined optimality as a balance between the learning gains of spacing divided by the time costs of that learning. However, our current models are suggesting spacing effects may be weak in certain circumstances. This is a problem for the prior method since the efficiencybased method predicts massing to be optimal despite research showing spacing effects for category or concept learning. We devised an alternative method that models the effect of prior practice as the sum of an inverted U-shaped function of the difficulty of prior learning events concerning the same concept. This model considers difficulty more broadly, predicting an optimum for both spacing effects and other forms of desirable difficulties. Predictions from this model reveal optimal levels of desirable difficulty as specific probabilities of performance, for each category or concept, which can be targeted during a practice session to optimize practice efficiency. This generalizes prior results with the spacing effect since spacing effects are a special case of desirable difficulty.

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12:00-1:30 PM (4177)

Exploring Novel Problems Before Instruction: Activity Type Matters. PHILLIP M. NEWMAN, *Vanderbilt University*, CAMPBELL R. BEGO and MARCI S. DECARO, *University of Louisville* – In instructional settings, exploratory learning activities provide students with a novel problem to solve before they are taught the underlying concepts and procedures. Exploratory learning often leads to better conceptual understanding but does not always. In two experiments, we compared explore-first and instruct-first conditions, varying the type of exploration activity between experiments. In explorefirst conditions, participants were given an activity (inventing a formula to calculate consistency), followed by instruction on standard deviation. In instruct-first conditions, participants completed the same materials in reverse order (instruction then activity). In Experiment 1, participants (N=116) completed the activity using a rich dataset. Learning scores were equal between conditions. In Experiment 2 (N=96), the activity was redesigned to highlight contrasting cases. Participants in the explore-first condition demonstrated significantly higher learning scores than those in the instruct-first condition. Activities that highlight important problem features facilitate learning from exploration.

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12:00-1:30 PM (4178)

Improving Problem Solving with Retrieval-Based Learning. GARRETT M. O'DAY and JEFFREY D. KARPICKE, Purdue University - Recent research asserts that the mnemonic benefits gained from retrieval-based learning vanish for complex materials. Subsequently, it is recommended that students study worked examples when learning how to solve problems. Additional studies have noted that the benefit from studying worked examples tends to occur only when the comparison problem-solving condition has poor performance during learning. In this situation, worked examples provide a learning benefit because the problem-solving condition is engaged in repetitive failure and is unable to engage in the critical processing that the test will require. In three experiments, students were asked to solve novel and complex probability problems. The results demonstrated a pronounced retrieval practice effect but only when the retrieval-based learning activities necessitated the same mental processing that was required during the final assessment.

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12:00-1:30 PM (4179)

Does Presentation Style Matter When Learning from Incorrect Worked Examples? RAUNAK M. PILLAI, Vanderbilt University, ABBEY M. LOEHR, Washington University in St. Louis, DARREN J. YEO and LISA K. FAZIO, Vanderbilt University (Sponsored by Lisa Fazio) - While research suggests that presenting incorrect worked examples can improve learning, there is relatively less inquiry about how best to present incorrect worked examples. To address this issue, we conducted a two-session study spanning oneweek in which students learned probability problems either by comparing pairs of correct and incorrect solutions, by studying correct and incorrect solutions sequentially, or by studying only correct solutions sequentially. We found no evidence of differences in learning outcomes between these presentation styles. One concern with incorrect worked examples is that participants may forget which solutions were correct versus



incorrect. However, even after a one-week delay, participants rated the studied correct solutions as being more correct than the studied incorrect solutions.

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12:00-1:30 PM (4180)

Examination of Recidivism Factors Among Incarcerated Drug Offenders in a Japanese Prison. UKEDA ERI, Hosei University, Mine Rehabilitation Program Center (Sponsored by Tetsuya Fujita) - The aim of this study is to improve the educational program implemented in a Japanese prison for drug offenders without any past incarceration record. A logistic regression analysis was conducted for this study. Explanatory variables comprised both static and dynamic factors (using the one-group pretest-posttest design). The objective variable was re-incarceration status after release. The results showed that the presence of physical disease had a negative impact on the risk of recidivism. This might indicate the importance of assessing the details of offenders' physical diseases, especially whether or not their diseases have any relationship with drug abuse. In addition, the study found that increasing the degree of general self-efficacy against drug dependence-interpersonal skillshad a positive influence on offenders' recidivism. From now on, it will be necessary to conduct analyses related to changes in other variables and to increase the measurement time points so as to follow the details of the changes and elucidate the cause of the changes in the indicator. When following the details of the changes, treatment providers need to consider the goal settings so that these offenders can recognize instructional goals as reachable

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12:00-1:30 PM (4181)

University Students' Use of Neuroenhancement for Academic Success. JENNIFER L. BRIERE, ARIANA FAUL, and TAMMY MARCHE, University of Saskatchewan (Presented by Jennifer L. Briere) (Sponsored by Tammy Marche) - Neuroenhancement (NE) is the use of psychoactive substances, or nootropics, to enhance pre-existing proficient cognitive abilities by neurologically healthy individuals (Englert & Wolff, 2015). NE can improve alertness, memory, and concentration (Hofmeister, Muilenburg, Kogan, & Elrod, 2010). Students use NE to improve academic performance (e.g., Emanuel et al., 2013), however, there has been little research examining students' NE use in Canada. Therefore, in the present study, participants (n = 271) completed an anonymous online survey of NE use (Emanuel et al., 2013) and everyday lapses in cognition (Broadbent, Cooper, FitzGerald, & Parkes, 1982). It was found that Canadian students use NE at a similar rate as American students, with aiding studying and feeling alert reported as the most common reasons for use. A positive relationship between lapses in cognitive performance and NE use was found. In order to develop appropriate intervention strategies and educate students on safe use of nootropic drugs, it is important to continue investigating how and why students are engaging in NE.

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12:00-1:30 PM (4182)

Exploring Relationships Between Autistic Traits and Executive Function in Typically-Functioning Adults. PATRICK J. CUSHEN and MEAGAN E. SMITH, Murray State University (Presented by Patrick Cushen) - People diagnosed with Autism Spectrum Disorder have been found to demonstrate impairments in executive function abilities such as cognitive flexibility, planning, visuospatial working memory, and verbal fluency. Less research has investigated the relationship between non-clinical levels of Autistic traits and performance on cognitive tasks in typically functioning populations. The goal of this study was to better understand this relationship. Participants were asked to fill out the Autism Quotient scale as well as multiple measures of cognitive ability including multiple reproductions of the Rey-Osterrieth Complex Figure, a series of fluency tasks (letter, category, and category-switching), a computerized version of a Tower of Hanoi task, and two memory tasks (letter span and backwards digit span). Results indicated multiple interesting and consistent relationships between the cognitive tasks, but fewer associations with the Autistic traits. Implications and future directions will be discussed.

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12:00-1:30 PM (4183)

Maximum Likelihood Estimation of Latent Capacity and Attention Lapses in a Whole Report Visual Array Task. DANIEL SCHOR, ALEX S. BRODERSEN, and BRADLEY S. GIBSON, University of Notre Dame - Recent research has suggested that individual differences in working memory capacity are modulated by differences in the fluctuations of arousal states thought to cause lapses of attention. One important line of research has devised a whole report visual array task to better measure capacity along with a computational model to help distinguish between graded vs. dichotomous lapses of attention. This research has concluded that attention lapses are better characterized as graded states, and more importantly that individual differences in performance appear to be due primarily to differences in lapse rate as opposed to capacity. Two studies are reported in this poster that further evaluated the relative importance of lapse rate and capacity in this task. Based on maximum likelihood estimation, the results consistently showed that a model in which both attention lapses and capacity were allowed to vary accounted for performance significantly better than a model in which only attention lapses were allowed to vary.

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12:00-1:30 PM (4184)

Does Familiarity Influence Maintenance in Visual Working Memory. PHILIPPE SCHNEIDER, *University of Fribourg*, EVIE VERGAUWE, *University of Geneva*, VALÉRIE CAMOS, *University of Fribourg* (Sponsored by Valérie Camos) – Familiarity affects recall performance in working memory (WM) tasks, with more familiar items yielding better performance than less familiar ones. However, the locus of this benefit is not yet clear. Several theories of WM have suggested that one of the main maintenance mechanisms, called attentional refreshing (AR) uses central attention to keep verbal as well as visual memory traces active for processing and recall. In a series of four experiments, we investigated the hypothesis that more familiar visual items are better maintained via AR than less familiar ones. To this aim, we systematically manipulated familiarity with two different types of material in two visual WM tasks, namely a Brown-Peterson and a complex-span task. Preliminary results show no indication that AR is modulated by familiarity. Implications for WM theories will be discussed. Email: Philippe Schneider, philippe.schneider@unifr.ch

12:00-1:30 PM (4185)

Investigating the Benefits of a Combined Cognitive and Motivational Intervention for Older Adults. ALEXANDRIA WEAVER, FRANCESCA TRANE, and SEUNG N MIN MOON, University of California, Irvine, MARTIN BUSCHKUEHL, MIND Research Institute, Irvine, ELENA CARBONE and ERIKA BORELLA, University of Padova, CHRISTOPH FLUECKIGER, University of Zurich, SUSANNE M. JAEGGI, University of California, Irvine (Sponsored by Martin Buschkuehl) - Most adults over the age of 65 will experience age-related cognitive decline in processing resources. Previous research has found potential benefits of training cognitive abilities that are affected by aging such as working memory (WM). However, despite the promising effects of cognitive training amongst older adults, there is evidence suggesting that standalone cognitive interventions might have limited effects, and that there may be other important factors that may boost the effects of training and facilitate learning. Such factors include one's motivation, beliefs about their potential to improve their intellectual abilities, as well as memory selfefficacy. We will be presenting the results from a combined WM training and metacognitive-motivational intervention targeting older adults. Forty older adults aged 65-85 participated in small group sessions that addressed topics related to healthy cognitive aging and benefits of living an engaged lifestyle while completing tablet-based WM training at home. Short- and long-term effects on cognitive performance will be compared with those of two active control interventions (N=80; WM or knowledge skills only), and implications for learning across the lifespan will be discussed.

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12:00-1:30 PM (4186)

Inhibition vs. Decay: Using Individual Differences to Test Working Memory Models. LAURA WERNER and COLLEEN M. PARKS, University of Nevada, Las Vegas (Sponsored by Colleen Parks) – The SOB-CS model of working memory proposes that distracting information is forgotten through an active inhibition process whereas the TBRS model proposes that forgetting occurs through a passive decay process. Because individual differences typically arise in active control but not passive processes, they can be used to adjudicate between the models. We tested high and low working memory capacity (WMC) individuals in a complex span task that measures distractor forgetting. Participants processed a series of words (targets and distractors) with the amount of free time after each distractor varying from short (.2s) to long (1.5s), thus varying the amount of time available to inhibit the distractors. Low WMC participants, as compared to high WMC, mistakenly remembered more distractors when given less free time. This suggests that forgetting distractors may be an active process that is sensitive to the amount of time available to inhibit, in line with the SOB-CS model.

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12:00-1:30 PM (4187)

Electrophysiological Evidence That Distraction Reduces Reliance on Working Memory. KIEUN LEEM, YE-JIN PARK, and MIN-SUK KANG, Sungkyunkwan University (Sponsored by Geoffrey Woodman) - Studies have suggested that we rely more on long-term memory but less on working memory if distraction is expected during the retention interval of working memory tasks. To test this hypothesis, participants performed a change-detection task over different blocks of trials. In one block, they performed a standard change-detection task without distractors (no-distraction block). In the other block, they performed the same task, but distractors were presented during the retention interval on 50% of trials (distraction block). To investigate how much working memory was used between the two conditions, we compared CDA, an electrophysiological index of working memory maintenance, during with trials without distractors in both no-distraction and distraction blocks. Despite indistinguishable behavior performance, we found that the CDA measured during the distraction block was reduced in relative to the no-distraction block. These results support the idea that working memory is relied on less when people expect to be distracted.

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12:00-1:30 PM (4188)

Distributed Neural Activity During Digit-Symbol Performance Discriminates Individual Differences in Working Memory. YUGUANG ZHAO, University of Texas at Dallas, NICHOLAS HUBBARD, Massachusetts Institute of Technology, MONROE P. TURNER, University of Texas at Dallas, MICHAEL MOTES and BART RYPMA, University of Texas at Dallas - The neural and cognitive bases of individual differences in working memory (WM) performance remain unknown. We tested the hypothesis that processing speed underlies WM performance differences using principal components analysis (PCA) with bootstrap confidence intervals (CIs), permitting us to predict individuals' WM performance from multi-regional fMRI data. 27 healthy adults (M age = 24.19 y, 16 f) completed a digit-symbol verification task (DSVT) and a Sternberg WM task (SWMT) during fMRI. In DSVT, participants indicated whether a probe digit-symbol pair was present among nine digit-symbol pairs. In SWMT, participants encoded 2, 4, or 6 letters, and decided whether a probe letter was present in the encoded set after a delay. Average β values from 14 frontal and parietal regions were used in the PCA. Results indicated that, with .95 CI, the DSVT-related fMRI pattern differences successfully separated the DSVT and SWMT performance. Those patterns in SWMT could not discriminate any performance differences. However, they did reveal a distinct fMRI pattern among different WM loads and



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12:00-1:30 PM (4189)

The In-Back: A Novel Paradigm for the Examination of Repetitive Patterns on N-Back Performance. FATOU SARR and SYLVAIN GAGNON, University of Ottawa (Sponsored by Sylvain Gagnon) - Recent studies have observed the influences of implicit stimuli on working memory. However, the variability in results between tasks creates challenges when defining the extent of unconscious influences. We investigated if working memory performance was altered (inflated) by implicit repeated patterns using our novel task, the in-back. The inback task was designed by modifying the n-back task to contain implicit stimuli (repeated sequences). Using 1, 2 and 3 n-back loads, we observed significantly decreased response time scores for all types of stimuli (explicit and implicit) (letters and digits), a practice effect well documented in literature for WM task reaction time. Significant increases in accuracy scores were observed exclusively for implicit stimuli. These results support a general model of performance enhancement by implicit influences on functional working memory.

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12:00-1:30 PM (4190)

Visual Short-Term Memory Load Interacts with Attentional Resources Reducing Apparent Contrast Perception via Contrast Gain. NIKOS KONSTANTINOU, Cyprus University of Technology, BAHADOR BAHRAMI, Max Planck Institute for Human Development, NILLI LAVIE, University College London -Previous research suggests common capacity-limited resources for encoding and maintenance of visual information. This research has been supported by evidence that visual perception is impaired when visual short-term memory (VSTM) resources are occupied in a high VSTM load task. However, the precise effects of VSTM load on perceptual processing remain unclear, specifically does VSTM load affect contrast gain or merely response gain? Here we assessed this with behavioural contrast response functions (CRF) for visual orientation discrimination under various levels of VSTM load. Higher VSTM load (larger set size in a colour and location VSTM task) shifted the contrast response function rightward consistent with a contrast gain mechanism. The VSTM load effect on the CRF was cancelled when a placeholder for the orientation stimulus reduced the spatial uncertainty. Our results suggest that VSTM load interacts interchangeably with contrast of unrelated stimuli reducing the contrast gain, consistent with the effects of perceptual load. Moreover, our results suggest that the resources engaged in VSTM interact with attentional resources involved in resolving the spatial boundaries of perceptual task-relevant areas in the visual field.

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12:00-1:30 PM (4191)

Neural Representation of Working Memory Content Is Not Static: Tracking Where and How Multiple Items Are Held in Mind. EVIE VERGAUWE, University of Geneva, CARLOS GONZALEZ-GARCIA and DAVID WISNIEWSKI, Ghent University, NAOMI LANGEROCK, University of Geneva, MARCEL BRASS, Ghent University - Goal-directed behavior requires a dynamic, flexible working memory system. The current fMRI study examines how and where the brain keeps multiple items in mind, across successive short periods of retention. Therefore, decoding was used to uncover contentspecific delay-period activity for multiple, successively presented memory items that needed to be recalled after multiple short retention delays. Our results show that, over successive retention periods, there is a clear shift in where memory items are represented in the brain, as well as in how memory items are represented in the brain, as more information needs to be held in working memory.

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12:00-1:30 PM (4192)

Emotional Processing and Electrodermal Activity Patterns. KRISZTIAN KASOS, ENIKO KASOS, LUCA CSIRMAZ, SZABOLCS ZIMONYI, FANNI VIKOR, and ANNA SZEKELY, Eötvös Loránd University (ELTE) (Sponsored by Anna Szekely) - Electrodermal activity (EDA) is widely accepted to be an indicator of arousal, stress and anxiety. There are results indicating that different dermatomes show different levels of arousal. There are also indications that different emotions elicit different electrodermal response amplitudes and lateralize the electrodermal responses on the palmar surfaces. The purpose of this presentation is to explore EDA measured at multiple dermatomes in response to different emotion inducing stimuli. In our first experiment we demonstrate that electrodermal responses show subtle differences when we encounter different emotional stimuli. We also acquired evidence that there are dermatome differences in the measured level of EDA and the electrodermal response amplitude. Our second experiment demonstrates that electrodermal activity lateralizes when one is in an altered state of consciousness. We also demonstrate individual differences in electrodermal laterality and the usefulness of EDA as an indicator of hemispheric lateralization. In conclusion, our results are in line with the multiple arousal theory. Furthermore, we demonstrate the usefulness of measuring EDA from multiple dermatomes.

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12:00-1:30 PM (4193)

Calibration of Distance Estimation Using Auditory Echoic Cues. TOMOKI MAEZAWA and JUN-ICHIRO KAWAHARA, *Hokkaido University* (Sponsored by Jun-ichiro Kawahara) – Echolocation is a method used to localize objects based on the reflection of self-generated sound, contributing to construct a spatial representation to localize a target. The present study examined whether the accuracy of a distance estimate could be improved during a repetitive task over 2 days. Participants estimated the distance from themselves to a reflector at 20– 50 cm using 10 s of 4 kHz click bursts produced through a loudspeaker. We provided visual and haptic feedback during a training period before the test period. The results indicated that the participants calibrated the estimated distance across 2 days, so that the estimated target location shifted closer to the participants. Thus, accuracy decreased for the target at the 50 cm distance. We suggest that feedback aids in calibrating the estimated distance, whereas the calibration did not reflect an improvement in the ability to localize distance.

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12:00-1:30 PM (4194)

Subjective Values Theory: The Psychophysics of Psychological Value. AMANDA R. CROMLEY, University of North Carolina Wilmington, DALE J. COHEN, University of North Carolina Wilmington (Sponsored by Dale Cohen) - We propose that people perceive the Psychological Value of all stimuli. Psychological Value is the perception of the importance of any stimulus to the observer. We have measured perceived Psychological Values of a variety of stimuli and demonstrated that those measurements predict participants' RTs and response choices in a variety of decision tasks. Here, we examine the psychophysical properties of perceived Psychological Value. Specifically, the current work examines how the perceived Psychological Value of a group of items changes as a function of (a) the number of items, and (b) the perceived Psychological Values of the individual items in the group. Using a magnitude estimation procedure, we collected perceived Psychological Values of individual items and groups of items. Results indicate that perceived Psychological Value of groups is well predicted by the perceived Psychological Value of the individual items but unaffected by the number of items in a group.

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12:00-1:30 PM (4195)

The Relationship Between Complexity and Aesthetic Preference in the Perception of Snowflakes. STEPHEN D. CHRISTMAN and DINGZHONG HU, University of Toledo (Presented by Stephen D. Christman) - Berlyne (1968) proposed that the relation between visual complexity and aesthetic preferences follows an inverted U-shaped relationship, with people preferring mid-range complexity. More recent work (Adkins & Norman, 2016), however, reported linear patterns, with increasing complexity associated with increasing preference. Norman and Adkins used snowflake silhouettes as stimuli and employed an objective measure of complexity: ratio of perimeter of object to the total area of the object. The current study had two aims: (i) to replicate their results, and (ii) to extend their research to snowflake stimuli whose internal details have been preserved. Results for the silhouette stimuli indicated an inverted U-shaped relation between complexity and preference. In contrast, preference distributions for the internal detail stimuli approached a normal curve, with most participants preferring the mid-range complexity snowflakes. The results suggest unexplored stimulus factors may influence whether the observed relation between complexity and aesthetic preference is linear or curvilinear.

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12:00-1:30 PM (4196)

Delayed Responses Mitigate Auditory Asymmetries in Duration Estimation. CORINNA D. MCFEATERS and DANIEL VOYER, University of New Brunswick (Sponsored by Daniel Voyer) - Left-right mapping of response alternatives has been demonstrated to play a role in observed auditory asymmetries when estimating brief intervals. One possible explanation is that lateralized stimulus presentation induces a Simon-type tendency to respond to the side of the stimulus presentation. If this is so, introducing a delay between stimulus presentation and response should decrease the effect. In the present experiment, participants completed a temporal bisection task, indicating either immediately or after a 500ms delay whether a word (bower) presented to the left or right ear was closer to the short (260 ms) or long (480 ms) anchor. Left-right mapping of the response options was manipulated between participants, and stimuli were spoken in either an angry or neutral tone. Response delay interacted with ear of presentation, spatial response mapping, and emotional tone, resulting in mitigation of the auditory asymmetry with a delay compared to when responses were immediate.

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12:00-1:30 PM (4197)

Odor Memory Reflects Novelty Detetion. E. LESLIE CAMERON, Carthage College, PER MØLLER, Copenhagen University - Olfaction safeguards some of our most vital functions and memory guides our interaction with odors. A new theory of olfactory cognition (Köster, Møller & Mojet, 2014, Front. Psychol.) suggests that the large number of familiar odors that we encounter daily provides us with a feeling of familiarity without engaging conscious cognitive resources, per se. We tested this theory in a series of experiments using incidental and intentional learning over long delays (15 mins -1 week) and intentional learning over short delays (5-30 secs) using both one-stimulus-at-a-time (monadic) and 3-alternative forced-choice tasks with common and uncommon odors and pictures. Memory declined with delay in both tasks and was better for pictures than odors and for common than uncommon items. Although percent correct (3AFC) was better than chance for common odors at all delays, and declined at long delays, hit rates in the monadic task dropped to chance after a week. Moreover, correct rejections increased with delay at both long and short delays. The results of these experiments, particularly the increase in correct rejections across all delays for odors that have been learned, support the theory that the function of odor memory is to detect novelty.

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12:00-1:30 PM (4198)

Feeling for Targets. DAVID A. ROSENBAUM, SOPHIA BOBADILLA, and HUNTER STURGILL, *University of California, Riverside* (Presented by David Rosenbaum) – Looking for targets has been studied extensively but feeling for targets has hardly been studied. Our participants saw an image of a red target among blue distractors, then reached into an unseen container and tried to find the target from among the distractors, retrieving it and noting whether it was red (target found) or blue (target not found). The target and distractors were plastic pipes, .5 in. in diameter. The target was always 1 in. long. The distractors were .25 in., .5 in., .75 in., 1.25 in., 1.5 in., or 1.75 in long. There were 4, 6, or 8 distractors of equal length per trial. Search time decreased as distractor length departed from target length, but the function was highly asymmetric. Targets "popped out" when the target was much larger than the distractors.

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12:00-1:30 PM (4199)

Does Local or Global Olfactory Focus Shift Visual Processing? JANE PLOMP, LILLIAN BEHM, and ALEXANDRA LIST, Hamilton College - When presented with complex sensory stimuli, perceivers can engage in local processing (focusing on stimulus details) or global processing (focusing on an integrated stimulus). Prior research has shown that within a sensory modality, engaging in one form of processing primes that same form of processing with a subsequent stimulus (vision: Robertson, 1996; audition: List & Justus, 2005). However, it remains unclear whether local/global priming occurs across modalities. Here, we test olfactory local/global priming of vision: will a local (or global) olfactory focus result in a local (or global) visual bias? In two experiments, participants were placed into local or global olfactory processing conditions, either through explicit instruction or stimulus manipulation, and their subsequent visual local-global bias was measured. Unlike within-modality findings, no local or global processing biases carried over cross-modally from olfaction to vision. These studies add to a broader multi-modal local-global priming research effort, arguing against a supramodal attentional or strategic mechanism. Furthermore, as methodological replications of since-contested published findings, they contribute to the scientific process of self-correction. Email: Alexandra List, alist@hamilton.edu

12:00-1:30 PM (4200)

String-Mediated Force-Based Haptic Perception of Shape from Motion. RACHEL BAZEN, Northern Michigan University, MOUNIA ZIAT, Bentley University, JOHN DE GROSBOIS and DEBRA-ADELE MISSE, Northern Michigan University, PATRICK A. CABE, University of North Carolina at Pembroke (Presented by Rachel Bazen) (Sponsored by Mounia Ziat) - Although vision and hearing acquire information about the distal environment, haptics traditionally requires contact between receptors and object properties. However, taut strings can transmit haptic information about the distal environment through force changes due to finger movements. Here, we tested haptic perception of rotating ellipses whose rims were in contact with strings held under tension against participants' stationary finger by suspended weights. Mechanical analyses indicate that force changes at the finger vary regularly with rotating ellipse shape, predicting shape perception. We varied the width of three ellipses; and participants reported the perceived shape of the rotating ellipse. Overall, a significant main effect of ellipse width was observed. Participants' estimates exhibited significant positive linear scaling with increases in ellipse width. Further, estimates of each of the three ellipses were significantly different

from one another. Thus, exploratory movements are not necessary for the haptic transmission of stimulus information at a distance.

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12:00-1:30 PM (4201)

Investigation of Fabric Texture Aversion in Haptodysphoric Individuals. HALEY GABOURY, Northern Michigan University, CAROLYN MURRAY, University of California, Los Angeles, MORGAN ANGEL, Northern Michigan University, MOUNIA ZIAT, Bentley University (Presented by Haley Gaboury) -Most individuals, upon feeling velvet, notice the rich texture. However, there are a distinct few who will rearrange their lives to avoid stroking such a fuzzy surface. This ill-defined aversion to specific, often fuzzy, textures has been colloquially termed haptodysphoria. To study this phenomenon, 15 undergraduate students were given a haptodysphoria questionnaire and then exposed to 33 textures. Participants were split post hoc on their responses to questionnaire items into "hapto-sensitive" and normal groups, and their scores of each fabric compared between groups. Although our results do not show evidence of a systematic dislike of fuzzy textures in the hapto-sensitive group, they do suggest that group showed preference for smoother textures and aversion to rougher ones. These findings indicate that this disorder may have less homogenous trigger textures than initially suggested and call for research into the particular textural and neurological features driving the aversive response. Email: Mounia Ziat, mziat@bentley.edu

12:00-1:30 PM (4202)

Is Everyone Selectively Influenced? Assessing Individual Differences in Bayesian Hierarchical Process Models. JULIA M. HAAF, University of Amsterdam - Cognitive process models are a popular tool to examine the underlying processing structure of cognitive phenomena. Previously, these models were either applied on the individual level, and individual differences were assessed via classification of parameter values, or they were applied on the aggregate level, and individual differences were ignored. Recently, with the rise of Bayesian statistics in the field, hierarchical process models are developed as a tool to draw inference on the aggregate level while still accounting for individuals. Usually, individual parameter estimates are ignored. Yet, these individual estimates are useful for examining individual differences. For example, we may ask whether everyone's processing structure is affected in the same way by a selective influence manipulation that targets specific processes. I show how individual differences in selective influence can be investigated for a multinomial processing tree model using ordinal constraints on individuals' parameters. Email: Julia M. Haaf, j.m.haaf@uva.nl

12:00-1:30 PM (4203)

Bayesian Inference of Dynamical Cognitive and Oculomotor Processes in the Swift Model of Reading. MAXIMILIAN M. RABE, JOHAN CHANDRA, ANDRÉ KRÜGEL, STEFAN A. SEELIG, and RALF ENGBERT, *University of Potsdam* – Recently, SWIFT (Engbert et al., 2005, Psych Review, 112, pp. 777-813) has been proposed and implemented in a Bayesian inference framework (Seelig et al., 2009, arXiv:1901.11110). For simulated and empirical data representing a broad range of reading behavior, the model captures a substantial amount of variability in reading measures within and between subjects. Model parameters were fitted on training subsets for each participant. Subsequently, data were predicted based on parameter point estimates and statistically compared against each respective participant's complementary test subset. For the majority of tested summary statistics, high correlations were found between predicted and empirical quantities, demonstrating high goodness-of-fit. Point estimates for model parameters were submitted to a regression analysis to explain subject-level variability between experimental conditions such as normal, mirrored and scrambled reading. The results demonstrate that SWIFT can reliably explain, describe and predict reading behavior under a wide range of experimental conditions.

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12:00-1:30 PM (4204)

Tracking Changes of Mind Through Mouse Movements. PASCAL J. KIESLICH, University of Mannheim, BENCE PALFI, University of Sussex, BARNABAS SZASZI, Eötvös Lorand University (ELTE), DIRK WULFF, University of Basel, BALAZS ACZEL, Eötvös Lorand University (ELTE) - The recording and analysis of computer mouse movements provides us with a window through which we can observe the dynamics of decision making. In the current project, we assess the potential of several analysis techniques that aim to detect how often people change their mind by using mouse-tracking data. This includes a number of established mouse-tracking indices (e.g., the number of x movement reversals). We also provide several newly developed methods for detecting changes of minds (CoMs), including one method based on areas of interest, one method that explores the movements along the horizontal axis in more detail and one method that assigns trajectories to different prototypes based on their similarity. To evaluate the methods, we conducted two studies that experimentally induced CoMs. We examined how sensitive each CoM measure is to the experimental manipulations. In addition, we assessed the extent to which each method agrees with human raters who determined the number of CoMs by visually inspecting each movement trajectory. Results suggest the new methods outperform the established indices. However, different methods are superior depending on the task under investigation and the criterion used for evaluation.

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12:00-1:30 PM (4205)

Classification as Bad Epoch Rejection (Caber): An Advanced Technique for Removing Low-Quality Trials from EEG Datasets. PHUI CHENG LIM, University of Nebraska-Lincoln, KARL M. KUNTZELMAN, University of Nebraska-Lincoln, MATTHEW R. JOHNSON, University of Nebraska-Lincoln – Electroencephalography (EEG) datasets always contain some number of low-quality trials, which ideally should be identified and removed before further analysis. Techniques exist for removing overt problems such as blinks or other ocular/ muscular artifacts; however, more subtle artifacts, or trials with poor data due to e.g. participant inattention, might be missed by traditional techniques. We developed the Classification As Bad Epoch Rejection (CABER) technique to filter out such trials and tested it on two sample datasets, using different cognitive paradigms and EEG systems. Classification performance improved significantly after CABERing, regardless of whether traditional artifact rejection was applied beforehand. Our results suggest that the CABER technique can be used to improve data quality across a range of datasets, which could facilitate the detection of subtle effects that might be missed with less sophisticated analyses.

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12:00-1:30 PM (4206)

The Goal Characteristics (Gc) Questionnaire: Measuring Goals' Content, Attainability, Interestingness, and Usefulness. GABRIELA YUKARI IWAMA, MARIA WIRZBERGER, and FALK LIEDER, Max Planck Institute for Intelligent Systems -Many studies have investigated how goal characteristics affect goal achievement. But most only considered a small number of characteristics. Furthermore, it remains unclear how goal characteristics should be measured, and the psychometric properties of existing measures are unknown. To overcome these limitations, we develop and validate a comprehensive measure for goal characteristics with four subscales measuring a goal's content, attainability, interestingness, and usefulness. In an online survey, 590 participants indicated their agreement to 171 statements on a 5-point Likert scale. A confirmatory factor analysis on a revised version with 105 items supported the four subscales and indicated that they jointly measure 27 distinct factors (CFI = .93; TLI = .93; RMSEA = .05; SRMR = .06). As a general measure, the GC questionnaire can be used to investigate how people set, pursue, and adjust organizational, educational, and personal goals (as well as other types of goals). The final version is available at https://osf.io/qfhup.

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12:00-1:30 PM (4207)

Mousetrap-Web: Mouse-Tracking in the Browser. FELIX HENNINGER and PASCAL J. KIESLICH, University of Mannheim - Mouse-tracking is a versatile method for monitoring the development of cognitive processes over time, particularly the temporal development of choices and the degree of conflict between response options. So far, this method has been limited to laboratory-based software, and not easily been available to researchers looking to conduct studies online. Thus, researchers forgo the advantages that internet-based research offers, such as the quick and efficient collection of larger and more diverse samples. As a solution, we introduce the mousetrap plugin for lab.js, a free online study builder. It provides a graphical interface for constructing experiments without requiring programming skills and allows for the easy implementation of mouse-tracking studies. Mousetrap-web also integrates with the mousetrap R package for processing, analysis and visualization of the collected data. We also discuss

the methodological challenges of moving beyond the laboratory and collecting mouse-tracking data in self-administered online studies, where the individual participants' hardware and environment are not as easily controlled. Our software is available free of charge, with open sources from https://github. com/felixhenninger/mousetrap-web.

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12:00-1:30 PM (4208)

Reducing the Number of Nonnaïve Participants in Your Mechanical Turk Samples. ETHAN A. MEYERS, ALEXANDER C. WALKER, JONATHAN A. FUGELSANG, and DEREK J. KOEHLER, University of Waterloo (Sponsored by Derek Koehler) - Using participants who have been previously exposed to experimental stimuli (referred to as nonnaïveté) can reduce effect sizes. The workforce of Amazon's Mechanical Turk is particularly vulnerable to this problem and solutions are usually cost and time inefficient. In response to this, we developed a novel participant recruitment strategy for conducting research on Mechanical Turk designed to recruit participants naïve to frequently-used experimental stimuli. We accomplished this by setting a maximum number of HITs participants can have completed on Mechanical Turk in order to be recruited for our experiments (50 for Study 1, 500 for Study 2). To assess the effectiveness of our method, we recruited "naïve" samples using our recruitment strategy and "experienced" samples using standard Mechanical Turk recruitment restrictions (i.e., 95% HIT approval rating). On tasks where using nonnaïve (vs. naïve) participants have been shown to reduce effect sizes (e.g., the Cognitive Reflection Test) we replicate these findings when comparing our samples. We demonstrate that restricting by the maximum number of HITs heavily reduces the number of "experienced" research subjects in samples without sacrificing data quality or collection speed. Email: Ethan A. Meyers, emeyers@uwaterloo.ca

12:00-1:30 PM (4209)

Modelling Publication Bias and Correcting Its Effects on Meta-Analysis. JUAN BOTELLA, Autonomous University of Madrid, MANUEL SUERO, Autonomous University of Madrid, IGNACIO I. DURÁN, Centro Universitario Cardenal Cisneros -Madrid, JESÚS PRIVADO, Complutense University of Madrid, DESIRÉE BLAZQUEZ, University of Murcia - Publication bias (PB) is one of the main threats to contemporary science. PB refers to any factor that affects the representativeness of the published studies, with respect to the total number of performed studies. If studies with statistically significant results are more likely to be published, then the accessible results provide a distorted view, generally resulting in an over-estimation of effect sizes. Meta-analysis, a methodology designed to combine results from independent studies to answer specific questions, has developed a number of methods to test for PB and to correct for its effects when estimating the effect size. However, as the proposed procedures have weaknesses, we still do not have a robust, powerful, and generally accepted method. We propose a new method designed to reconstruct the population distribution of effects from the distribution truncated by significance, assuming a random effects model. It is based on the subset of published studies that found significant effects. The simulations performed show that the method efficiently recovers the original distribution when the number of significant studies is sufficiently large.

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12:00-1:30 PM (4210)

The Spatial Arrangement Method of Collecting Similarity Ratings Can Capture Higher Dimensional, Conceptual Similarity Structures. MICHAEL C. HOUT, New Mexico State University, RUSSELL RICHIE, University of Pennsylvania, BRYAN WHITE, New Mexico State University, SUDEEP BHATIA, University of Pennsylvania (Presented by Michael Hout) - Psychologists often collect similarity data to understand fine-grained category structure (Shepard, 1980). However, collecting similarity judgments between all pairs of items in a category is expensive, leading to development of new techniques like the Spatial Arrangement Method (SpAM; Goldstone, 1993), whereby participants place items on a 2-dimensional plane such that spatial distance reflects perceived similarity. While this technique has been extensively and successfully used for lower-dimensional, perceptual stimuli, its suitability for higher-dimensional, conceptual stimuli is less understood. Here we evaluate this for 8 different categories composed of 20-30 words each. First, stress plots from multidimensional scaling solutions of different dimensionalities suggest stress decreases beyond 2 and even 3 component solutions. Second, split-half reliability of word-word similarities is high (r=.82), while the average correlation between pairs of participants is low (r=.07), suggesting that through different participants appreciating different pairs of dimensions, high-dimensional but reliable aggregate similarity data can be obtained. We conclude that SpAM is suitable for high-dimensional stimuli like words and concepts.

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12:00-1:30 PM (4211)

Comparing the Performance of Cognitive Tasks Between Japanese Crowd Workers and University Students. HIROKO NAKAMURA, Aichi Shukutoku University, YOSHIMASA MAJIMA, Hokusei Gakuen University - The present study examined whether the online cognitive experiment with crowd workers (CW) is a reliable research method as well as conventional laboratory experiments with university students. It has been pointed out that data from online studies are "noisy" than laboratory study due to lack of control in the apparatus and environment. Despite this disadvantage, many studies also reported that online experiments with CW successfully replicated the task-specific effects in attention and cognitive control tasks (e.g., flanker task). In this study, we examined whether online experiments could replicate the task-specific effects seen in previous studies, even in more complex cognitive tasks (e.g., mental rotation task, levels of processing task, mood induction task). We conducted a series of experiments run in Qualtrics with Javascript. Participants collected from Japanese CW and university students engaged those tasks using the same browser. The present study successfully replicated the taskspecific effects of all tasks both in students and CW. Our results indicated that the fidelity of the online experiment with crowd workers as a method of complex cognitive behavioral studies. Email: Hiroko Nakamura, nkmr@asu.aasa.ac.jp

12:00-1:30 PM (4212)

Quick, Quick, Slow: Is Timing Accuracy Getting Worse in Computer-Based Studies and Could This Be Affecting Your Ability to Replicate? RICHARD R. PLANT, The Black Box ToolKit - Many researchers make use of computers to present stimuli, interface with other equipment and record responses. There is a tacit understanding that achieving consistency may not be as easy as simply entering identical parameters into different hardware configurations or software packages. With renewed emphasis on replication across the field now might be an appropriate juncture to address the issues at the individual researcher, journal editor and funder levels. Our own research suggests accuracy is getting worse as hardware becomes faster and software for experimental control more complex. In most other fields poorly controlled studies that did not outline methodology fully or state confidence limits for equipment accuracy would not be published. In this paper we outline the issues, common pitfalls and offer practical solutions, e.g. to move all presentation, synchronisation and response timing off the experimental platform and on to external chronometry whilst adding little or no overhead for the experimenter. Email: Richard R. Plant, r.plant@blackboxtoolkit.com

12:00-1:30 PM (4213)

It's Really tough to Measure Discriminability: Frequency of Type I Error Rates for the (Geometric) Area Under the Roc Curve. ADVA LEVI, Tel Aviv University, CAREN M. ROTELLO, University of Massachusetts, YONATAN GOSHEN-GOTTSTEIN, Tel Aviv University (Sponsored by Yonatan Goshen-Gottstein) - The choice of an appropriate measure of discriminability is a critical decision for researchers, because each measure requires the underlying distribution to meet different assumptions. For example, Rotello et al. (2008) demonstrated that d' leads to erroneous conclusions if the assumption of equal-variance Gaussian distributions is violated. Here, we examined geometric area under the ROC curve (A_a, Pollack & Hsieh, 1969)—a non-parametric measure of discrimination argued to be independent of bias. Using Monte-Carlo simulations, we examined the size of the Type I error for the comparison of two A_e values when two conditions were drawn from distributions with identical discriminability but different bias. We manipulated the form of stimuli and noise distributions (Normal, Rectangular), the variance of the noise and target distributions (equal, unequal), and the arrangement of the different choice criteria. Our findings reveal heretofore undocumented difficulties in using A_g to compare differences in discriminability between two conditions. Email: Adva Levi, Advalevi@mail.tau.ac.il

12:00-1:30 PM (4214)

Aggregate Grand Averaging: Safe Data-Driven Region-Of-Interest Selection for ERP Research. JOSEPH L. BROOKS, *Keele University*, ALEXIA ZOUMPOULAKI, *Cardiff University*, HOWARD BOWMAN, University of Kent & Birmingham University - Neural mechanisms of cognitive phenomena are routinely studied with event-related potentials (ERPs). During ERP data analysis, it is often difficult to know, a priori, precisely where effects will occur on the scalp, in time, and in frequency (for oscillations). To overcome this, researchers often identify regions-of-interest (ROIs), but have been criticized for sometimes using biased, data-driven methods which inflate Type I error rates. Through simulations and analysis of human ERP data, we demonstrate a data-driven ROI-selection method using the aggregated-grand average (AGAT) wave which controls Type I error rate. Importantly, it relaxes the precision necessary in a priori ROI specification. We demonstrate that the AGAT is orthogonal to the experimental contrast and, importantly, show that other common methods for computing orthogonal waveforms for ROI selection can inflate Type I error rate under some conditions. Finally, we show that the AGAT method has superior statistical power over common a priori ROI selection methods by up to 60%. Our results demonstrate a simple, unbiased and data-driven ROI selection method which is relevant for replicable and powerful ERP analysis in studies of sensory and cognitive ERP components.

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12:00-1:30 PM (4215)

Data Dictionaries: Shareable Datasets for All. ARI L. CUNNINGHAM, Missouri State University, ERIN M. BUCHANAN, Harrisburg University of Science and Technology, SARAH CRAIN, HANNAH JOHNSON, and HANNAH STASH, Missouri State University (Sponsored by Erin Buchanan) - Progress in science depends on collaboration, but much of the scientific process happens out of sight in the lab, and often only the final publication is available. Open data is beneficial for both individual researchers and science, because it facilitates the spread of knowledge and improvements in research. Furthermore, open data promotes both the inclusivity and diversity of options for all researchers - for example, those who cannot collect large samples within a minority population due to geographic location can be aided by open datasets to combine for analysis. As one open data solution, data dictionaries are metadata documents that allow researchers to make their data more public and easier to interpret. We provide tutorials for three potential data dictionary creators-Codebook, DataSchema, and DD Creator-each with its own benefits and limitations. In this presentation, we will demonstrate the applications available and explore how researchers might get started with creating open, shareable data (see osf.io/3y2ex/). The usefulness of open data in promoting inclusivity in science will also be explored through the lens of a recent megalab project.

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12:00-1:30 PM (4216)

Factor Analysis of the French Version of the CES (CES-F). DARA G. FRIEDMAN-WHEELER, *Goucher College*, AHMED IBRAHIM, *Goucher College & Johns Hopkins University*, ASHLYN APPELBAUM, KENDALL BELMONT, LAURIE GROSHON, SAMANTHA KLOCK, SOPHIE WILTSE, and CHRISTINA YARRISH, *Goucher College* – The Coping Expectancies Scale (CES) is a vignette measure of outcome expectancies for coping strategies. In the first phase of this study, researchers translated the CES into French, according to established guidelines. Bilingual adults then completed both the French and English versions online, and adjustments were made to maximize semantic and conceptual equivalence. Next, 245 French-speaking adults completed the revised CES-F online. Here we present the results of Exploratory Factor Analysis of the French version of the CES (CES-F). Factors were extracted using Maximum Likelihood Extraction and Promax rotation. Parallel analysis suggested retaining five factors. Items that loaded at least .35 on a given factor were retained. The factors represented expectancies for: avoidant coping, tensionreduction, positive cognitive coping, negative cognitive coping, and distraction. These factors differ from those found in the English version of the CES. Implications are discussed. Email: Dara G. Friedman-Wheeler, darafw@goucher.edu

Poster Session V Saturday Evening Room 517 B Viewing 4:00-7:30 PM, Author Present 6:00-7:30 PM

POSTER SESSION V

6:00-7:30 PM (5001)

Temporal Resolution of Visual Attention in Autism Spectrum Disorder. SYLVIA B. GUILLORY and HANNAH GROSMAN, Icahn School of Medicine at Mount Sinai, CHRISTOPHER S. MCLAUGHLIN, Icahn School of Medicine at Mount Sinai, EMILY ISENSTEIN, University of Rochester, EMMA WILKINSON, PAIGE SIPER, ALEXANDER KOLEVZON, A. TING WANG, JOSEPH D. BUXBAUM, and JENNIFER H. FOSS-FEIG, Icahn School of Medicine at Mount Sinai - Sensory abnormalities are a common feature of autism spectrum disorder (ASD). Research suggests temporal processing of sensory information may be altered in ASD, underlying core ASD symptomatology. In the current study, the temporal resolution at which the visual system can segregate information was measured by determining the frequency of temporal individualization. Eye tracking data were recorded during a four-alternative preferential-looking paradigm where four squares flickered between black and white states at four temporal frequencies: 0.2, 0.5, 1, or 2 Hz. A target square flickered out of phase with the three distractors, such that when the distractors were white the target appeared black. Preferential looking to the target square indicates the phase of the squares are successfully individuated at that flicker frequency. Both ASD children (n=24) and age-matched typically developing controls (n=21) performed worse at individuating the out-ofphase target square from the distractors (p < 0.001) at the highest flicker frequency (2 Hz). These findings support previous research that though temporal processing appears altered in ASD, it may be relatively spared in the visual domain. Email: Sylvia B. Guillory, sylvia.guillory@mssm.edu

6:00-7:30 PM (5002)

Congruency Effects in Shape Identification Across Different Masking and Crowding Conditions. STEVEN J. HAASE, Shippensburg University, GARY D. FISK, Georgia Southwestern State University - Spatial crowding is minimal in foveal vision, but there is evidence for foveal temporal crowding. We investigated the relationship between various forms of masking and crowding on simple shape identification. On each trial, a target shape (solid diamond or square) presented in central vision was preceded or followed (i.e., backwardly masked) by a distractor stimulus (either a large distractor or group of targetsized shapes). The distractor conditions were pattern mask, metacontrast mask, and two "crowding" conditions (near vs. distant). Not surprisingly, the largest masking effect was from the backward pattern masking condition. Also, the backward masking conditions showed larger congruency effects in both RT and accuracy compared to forward masking conditions. We did find a crowding effect in the backward masking condition: RT was faster for the distant crowding condition compared to the near condition (d = 1.02). A congruency effect was only

found in the near condition (d = 0.44). However, accuracy did not differ much between the near and distant conditions (d = 0.08). Our current research is investigating the influence of cortically scaled distractors in the periphery on foveal target identification.

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6:00-7:30 PM (5003)

The Top-Down Influence of Object Complexity on Brain Activity in Early Visual Areas. EVAN N. LINTZ, University of Nebraska-Lincoln, MATTHEW R. JOHNSON, University of Nebraska-Lincoln (Sponsored by Robert Belli) - In this study, we sought to examine what object properties might contribute to visual complexity and how that complexity affects responses in visual brain regions, while controlling for low-level differences between objects as much as possible. We presented a unique type of block-design fMRI task in which "simple" and "complex" shapes were formed entirely from illusory contours (ICs). All shapes appeared inside circles of a rotating, randomly generated plaid, a region of whose interior rotated in the opposite direction, with the object edges defined by the boundaries of the different rotation directions. Critically, because these plaids were designed to saturate the neural and BOLD response to low-level visual properties, differences in activation would be due solely to the shape of the IC. In addition to the base plaid (no IC shape), seven conditions of IC shapes were presented, varying in symmetry, regularity, and the number of edges and corners, and controlling for shape diameter and area. We found that shapes of all levels of complexity enhanced V1 activation versus a control plaid. The most complex shapes elicited a greater response than less complex shapes, and no differences were observed among shapes of similar complexity. Email: Evan N. Lintz, Evan.lintz@huskers.unl.edu

6:00-7:30 PM (5004)

The Cues That Bind: Examining Multiple-Object Motion Perception Through an Optical Illusion. JOSHUA E. ZOSKY, University of Nebraska-Lincoln, MARIAN E. BERRYHILL, University of Nevada, Reno, SARAH M. HAIGH, University of Nevada, Reno, LOGAN L. MILLER and MICHAEL D. DODD, University of Nebraska-Lincoln (Sponsored by Michael Dodd) - Visual motion perception relies on multiple cues to inform the observer of an object's directionality. A new optical illusion (Z-Box illusion) was presented to examine which cues are necessary for generating an accurate perception of motion: structural-complexity, motion parallax. When viewing a rotating 3D particle sphere, participants' accuracy for correctly determining the direction of motion increased proportionately with the number of particles. Participants could not disentangle the direction of the sphere from the more salient motion of a task-irrelevant, rotating 3D cube surrounding the sphere, leading to judgments that the box and sphere move in tandem. While this finding was true in lower particle-counts, higher particle counts increasingly led to the disambiguation of motion between the two items. These results shed light on the critical details necessary for motion perception.

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6:00-7:30 PM (5005)

Does Exposure to Attractive Faces Affect Perception Towards Self and Other Faces? CHUNSHI ZHOU and AKIRA ISHIGUCHI, Ochanomizu University (Sponsored by Akira Ishiguchi) - Human being has self-advantage to themselves for face recognition. According to previous researches, exposure to appearance-focused SNS impacts on body image concern. These suggested that the exposure to attractive faces could affect how people sense faces differently. In addition to this possibility, we also studied following issues: the aftereffect and the cultural differences on attractive faces recognition. In this study, first we used morphing method to investigate if there is self-serving preference towards peoples' own faces. Secondly, we tested whether the aftereffect is also generated in attractive-facerecognition process. Thirdly, we examined if exposure to attractive faces would affect perception to their own faces and others, and if there are any cultural differences between Chinese and Japanese. Results indicate that self-advantage was revealed. Surprisingly, aftereffect was observed in attractive faces but in opposite direction. We found Japanese and Chinese perceive faces from different standards.

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6:00-7:30 PM (5006)

Some Results Consistent with a Distance Field Hypothesis of Frontal Distance Assessment. STEPHEN DOPKINS and GORDON MCINTIRE, George Washington University - According to a recent hypothesis the distance between two frontal points is assessed from the number of 'distance fields' falling between the points. Under some interpretations the distance fields can be re-configured to suit the current task. Under an alternative hypothesis the distance between two points is assessed from the difference between their locations in a position system. We present several findings consistent with the distance field hypothesis and suggest how they might be modeled within it. 1. Comparison distances are better discriminated with respect to a standard when the distances lie along the vertical than the horizontal axis but only when the vertical and horizontal distances are judged in the same session and only when the vertical and horizontal standards lie in the same range. 2. Comparison distances are better discriminated with respect to a given standard when the distances lie along an axis orthogonal to the axis that is expected. Again, this only occurs when the standards for the two axes lie in the same range. 3. Comparison distances are better discriminated with respect to a given standard the more levels of distance are tested and the smaller the difference there is between adjacent levels. Email: Stephen Dopkins, dopkins@gwu.edu

6:00-7:30 PM (5007)

Face Adaptation Effects of Non-Configural Face Information. RONJA MUELLER, *Medical School Hamburg*, SANDRA UTZ and CLAUS-CHRISTIAN CARBON, *University of Bamberg*, TILO STROBACH, Medical School Hamburg (Sponsored by Tilo Strobach) - Adapting to previously inspected faces can affect the perception of faces seen subsequently. Recent studies employing famous faces were able to show robust adaptation effects over longer time periods (hours and days), suggesting an adaptation on a representational memory basis. However, most face adaptation research has focused on configural information (i.e., mostly addressing 2nd-order relations) and adaptation effects to non-configural face information, such as color, are barely investigated so far. Most likely because color adaptation effects are typically considered to be rather transient and therefore do not seem to affect a representational memory basis (i.e. the probably affect just a sensory level of processing). However, here we investigated face adaptation effects to color by manipulating brightness and saturation. Results of our studies provide evidence for reliable color adaptation effects, which are face-specific and robust over time. This supports the view that color adaptation can affect a representational memory level. Email: Ronja Mueller, ronja.mueller@medicalschool-hamburg. de

6:00-7:30 PM (5008)

Trustworthiness: Differences in Evaluating Mental Representations as a Function of Face Ethnicity. FRANCIS GINGRAS and JUSTINE GOULET, University of Quebec, Outaouais, KAROLANN ROBINSON, University of Quebec, Outaouais, MARIE-PIER PLOUFFE-DEMERS, University of Quebec, Montreal, MICHAËL MASSICOTTE, DANIEL FISET, and CAROLINE BLAIS, University of Quebec, Outaouais -Evaluations of trustworthiness are spontaneously made from faces. Few studies have explored how these perceptions might vary when observing faces of other ethnicities. The present study used Reverse Correlation to visualize mental representations of trustworthiness for Black and White faces in 28 White North-American participants. The Stat4CI's cluster test (t_{crit}=3.0, k=246, p<0.025) revealed that perception of trustworthiness is associated with a lighter eye region for a White face and a darker right eye as well as a lighter mouth for a Black face. Statistically comparing classification images revealed that the eve region varied more in trustworthiness evaluations of White faces, while the mouth region showed more variations in Black faces. The interpretation of these result will be discussed in light of two additional experiments: one using the same task with Black Africans participants, the other using a face stimuli representing the perceptual mid-point of a Black and White face.

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6:00-7:30 PM (5009)

Insight into Objects' Function Biases Perception. DICK DUBBELDE and SARAH SHOMSTEIN, *George Washington University* (Sponsored by Sarah Shomstein) – Object recognition is largely a result of processing within the dorsal and ventral visual streams, each differentially recruited depending on object characteristics, with manipulable objects (tools) recruiting dorsal regions more than non-tool objects. We hypothesize that this differential processing should have behavioral consequences. Given the relative proportions of magno- and parvo-cellular input to each stream, processing along the dorsal stream should have temporal sensitivity, while ventral stream should have spatial sensitivity. We test this hypothesis using two tasks: object flicker detection, testing the temporal resolution of the dorsal magnocellular processing; and gap detection, testing the spatial resolution of the ventral parvocellular processing. Across three experiments we show a non-tool advantage in spatial resolution, that this advantage is object semantic content dependent, and that this advantage diminishes when suppressing magnocellular processing with red light. These results demonstrate perceptual differences in object processing arising from differential recruitment of the two processing streams.

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6:00-7:30 PM (5010)

Foreshortening in Elevation and Azimuth Produces Large Errors in Perception of Angles. MARTA WNUCZKO and JOHN M. KENNEDY, *University of Toronto* – As objects recede into depth, vision underestimates foreshortening. It fails to grasp the changing relations between elevations and azimuths. This failure should lead to very large errors in perception of angles. Observers viewed real surfaces (walls and grounds) on which angles were drawn. They estimated acute angles between a z-line, receding from the observer into depth, and an oblique line. Foreshortening was increased by increasing the distance from the eye to the surface bearing the target or by increasing the distance of the oblique along the z-line. Both tactics for increasing foreshortening lead to large errors. The more foreshortening, the larger the error.

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6:00-7:30 PM (5011)

Link Between Independent Measures of Face Processing Abilities and Horizontal Tuning for Faces. ISABELLE CHARBONNEAU and JUSTIN DUNCAN, Université du Québec, Outaouais, JESSICA ROYER, McGill University, GABRIELLE V. DUGAS, GUILLAUME LALONDE-BEAUDOIN, CAROLINE BLAIS, and DANIEL FISET, Université du Québec, Outaouais (Sponsored by Daniel Fiset) -Horizontal spatial information for face processing has recently been highlighted for their important role in face detection (Balas, Schmidt & Saville, 2015), face identification (Goffaux & Dakin, 2010) and facial expression recognition (Huynh & Balas, 2014). However, one might wonder what link could exist between face identification abilities and horizontal tuning. Therefore, in this study, face processing and horizontal selectivity were examined in independent tasks. Using a principal component analysis, a single face ability score was computed for each subject (N=37) based on their scores obtained in the Cambridge Face Memory Test +, the Cambridge Face Perception Test, and the Glasgow Face Matching Task. In a separate task using the orientation bubbles method (Duncan et al., 2017), subjects were asked to identify filtered face stimuli with different orientations on a trial basis (600 trials per subject). This method allows to extract individual orientation profiles and horizontal tuning scores for faces. A significant positive correlation, r= 0.4, CI

95%= [0.13; 0.64], p< 0.05, was observed between the two measures indicating that horizontal processing is crucial for face perception and account for 16% of the variance explained. Email: Isabelle Charbonneau, chai22@uqo.ca

6:00-7:30 PM (5012)

Are Exposure Duration and Spatial Proximity of the Stimuli Separable Factors? VINCENT DI LOLLO, TAYLOR CORK, NADJA JANKOVIC, and THOMAS M. SPALEK, Simon Fraser University (Presented by Vincent Di Lollo) - Visible persistence of a brief display has been studied with a 5×5 square dot matrix presented in two sequential frames of 12 dots each, separated by a variable ISI. Observers name the location of the missing dot. This can be done easily only at ISIs < 100 ms and yields an estimate of the visible persistence of the leading frame. Visible persistence is progressively reduced as the duration of the leading frame is increased and when the inter-dot separation is decreased. In Experiment 1 (E1) we used a fully crossed design and found that the response functions were parallel with one another, suggesting that those two factors are independent (separable), and that they are subserved by independent underlying mechanisms. In E2 we used a similar design to study motion perception between two sequential lines that were seen as in directional motion. Goodness of motion is governed by the exposure duration of the leading line and by the interline separation. Again, we found parallel functions suggesting independent underlying mechanisms. We speculate that the effect of duration is mediated by the neural on-response of the first stimulus (Duysens et al., 1985), and the effect of interstimulus separation is mediated by lateral inhibition. Email: Vincent Di Lollo, enzo@sfu.ca

6:00-7:30 PM (5013)

Elimination of Photoparoxysmal Epileptiform Activity Using Coloured Glasses in a Case of Photosensitive Epilepsy. RACHELLE SASS, University of Manitoba (Sponsored by Ulf-Dietrich Reips) - Epilepsy, a tendency to recurrent seizures, affects more than 50 million individuals worldwide and can endanger patients, as well as adversely impact their quality of life. Despite a century of pharmaceutical development, one third of patients fail to respond to medication altogether, and a non-pharmacological approach is desperately required. In our present research, we tested whether specific tints of lenses in Uvex[®] glasses can reduce the incidence of irregular brain spikes - termed paroxysmal response (PPR) - over electroencephalogram (EEG) in a patient with photosensitive epilepsy using photic stimulation. We tested 13 pairs of glasses which utilized Uvex Spectrum Control Technology® that incorporates unique dyes formulated to manipulate light by absorbing specific wavelengths. Based on the EEG results, five tints showed a significant reduction in PPR, including three tints that mitigated PPR completely. Coloured glasses therefore hold promise to inhibit seizures in patients with photosensitive epilepsy. Future implications involve advances in the healthcare industry through new technological developments in optical care. We discuss these implications and further research directions, including tests of tinted contact lenses. Email: Rachelle Sass, umsass@myumanitoba.ca

6:00-7:30 PM (5014)

Viewpoint and Consistency of Viewpoint in Holistic Processing of Static and Dynamic Faces. GUOMEI ZHOU, YU ZHOU, and XINGE LIU, Sun Yat-sen University, XINRAN FENG, Sun Yat-sen University - It has been well-documented that the static face processing is holistic. However, it is controversial whether the dynamic face processing is as holistic as the static face processing. The present study investigated effects of viewpoint and viewpoint consistency on the holistic processing of static/dynamic faces. Participants were asked to complete a complete-design composite face task. In each trial, two faces sequentially showed on the screen. Participants were asked to judge whether the top halves of those two faces were same or not. The first face was a static/dynamic face rotated in depth at 30°, 60°, and 90°, while the second face was a frontview static face in Experiment 1 or was identical with the first face in motion and viewpoint in Experiment 2. In Experiment 3, inverted faces were included. Results showed that holistic processing is not sensitive to viewpoint on depth rotation no matter dynamic faces or static faces. However, viewpoint consistency significantly increases holistic processing. Interestingly, there was holistic processing for dynamic inverted faces, not for static inverted faces. These results indicated that the face composite holistic processing effect was sensitive to motion and viewpoint consistency.

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6:00-7:30 PM (5015)

Revisiting Emotionally Enhanced Vividness. LOGAN K. DOYLE and SUSANNE FERBER, University of Toronto (Sponsored by Michael Mack) - The report of enhanced vividness of emotional scenes over neutral scenes has been conceptualized as a perceptual enhancement in viewing emotional images. It could, however, also be explained as a bias of recall from memory. To investigate this effect of enhanced vividness, participants viewed emotionally salient images of negative valence or neutral greyscale images with different applied noise levels. After a brief retention interval, the images were then presented again, and participants were asked to add noise to the image until it matched the remembered presentation by moving a slider. When applying noise to emotional images, participants applied significantly more noise than they did for neutral images. We also observed an interaction of noise level and emotional content, as this effect is not found at the highest original noise level. These findings suggest contributions from both memory and perception to the phenomena of emotionally enhanced vividness.

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6:00-7:30 PM (5016)

The Precision of Outlier Representations. BURCU AVCI, *Boğaziçi University*, AYSECAN BODUROGLU, *Boğaziçi University* (Sponsored by Aysecan Boduroglu) – The visual system rapidly detects outliers and viewers form higher resolution perceptual and working memory representations of the size of spatial outliers compared to other items. In these earlier studies, the outlier item differed from the remaining set by only one dimension. In the present study, we investigated whether viewers form greater resolution representations of items that differ from the remaining set on two dimensions as opposed to one dimension. To investigate this, we compared how accurately viewers represent the orientation of lines that differed from the entire set either only by its spatial location or by its spatial location and tilt. Viewers reported the latter set of orientations with greater precision. The responses were significantly better than the ensemble representation of the entire set and the local mean excluding the outlier, suggesting that outliers have a unique representational status, with additional deviant features contributing to in greater precision. Email: Aysecan Boduroglu, aysecan.boduroglu@boun.edu.tr

6:00-7:30 PM (5017)

Judging Faces: When Facial Features Are Perceived as Stereotypical and Dominant. HEATHER KLEIDER-OFFUTT, ASHLEY MEACHAM, LEE MARTIN, and MEGAN CAPODANNO, Georgia State University - Black men who are perceived to have stereotypical features are more likely to be judged in a negative manner regarding behaviors such as aggression and threat. Similarly, first impression research finds that faces perceived as dominant are also evaluated negatively. Given these commonalities, it is unclear whether features that signify dominance also underpin judgments of individuals perceived as stereotypically Black. However, are these features in the face or in the eye of the beholder? We used a crossclassified multilevel model (CCMM) to isolate variance due to the computer-generated face versus the consistency of the rater. When assessing dominance and Black stereotypicality, zero order correlations showed a mild relationship; an unconditional CCMM revealed a strong relationship; and a conditional CCMM revealed a very weak relationship. Overall, results suggest that while raters have substantial variability, much of the variance is among face stimuli, implying a consistent relation between dominance and stereotypical features.

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6:00-7:30 PM (5018)

Accuracy of Perception of Point of Gaze at Social Interaction Distances. ELIZABETH STERLING and JAN BERKHOUT, University of South Dakota (Sponsored by Jan Berkhout) -The two eyes in a human head are a display. Other humans must often decide what those eyes are looking at. This study determined the accuracy of such judgments at a distance of two meters. This distance is typical of many social interactions. Participants observed a Gazer looking towards them across a matrix of 48 points 5 degrees apart. We scored the size and direction of erroneous judgments, creating an accuracy measure for 42 participants. Averaged accuracy ranged from 4:50 Deg. to 9:20 Deg. The best performers correctly detected 75% of the 48 gaze locations. The poorest performer scored zero. There were differences in bias among the 42 participants. Many reported the Gazer's target above its actual location. Others showed a difference between the left and right sides of their visual field. Very few showed an egocentric bias, incorrectly reporting being looked at directly

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6:00-7:30 PM (5019)

Does Imagery Hinder or Facilitate Perception? A Reverse Perky Effect at Low Contrasts. CATHERINE CRAVER-LEMLEY, Elizabethtown College, ADAM REEVES, Northeastern University (Presented by Catherine Craver-Lemley) - Visual, but not auditory, imagery typically interferes with seeing (the Perky effect), and auditory, but not visual, imagery can interfere with hearing, as if images and percepts in the same modality typically conflict (Segal & Fusella, 1970; Craver-Lemley & Reeves, 1987). However, Ishai & Sagi (1995) found that visual images can facilitate detection of Gabor patterns. Here we report that this discrepancy is not primarily due to the change from the sharp-edged targets used in the Perky effect studies to the softer Gabors, but rather to the level of performance; visual imagery interferes with perception (as inferred from acuity) when performance is high, but facilitates when performance is poor. This somewhat counter-intuitive finding is analogous to the 'dipper' function obtained when visual stimuli that mask visual targets presented well above threshold improve target detections just above threshold.

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6:00-7:30 PM (5020)

Less Is More in Visual Perception and Preference: A Surprising and Powerful "Partial Information Effect" in Face Processing. JAVID SADR, University of Lethbridge -Illustrating a very counterintuitive and profound effect of lowlevel image manipulation on high-level subjective evaluation and preference, we present the results of a collection of diverse facial attractiveness (or attraction) experiments, all of which consistently demonstrate a markedly enhanced preference for diminished stimuli. Besides a number of important implications specific to face perception -- a developmentallypreserved privileging of low spatial frequencies (as likewise observed in detection and recognition), a re-evaluation of bilateral symmetry, etc -- these surprising findings prompt a serious reconsideration of evolutionary psychology accounts of facial attractiveness, force the distinction between objective, subjective, and intermediate levels of analysis, and encourage a fundamental reconciliation of too-modular views of perception, memory, and affect. More, these experiments and findings integrate and further specify key theoretical aspects of classic mere-exposure effects, familiarity (mis)attribution, recognition, and perceptual/cognitive fluency accounts of subjective/hedonic response, e.g., discarding objective stimulus clarity in favour of perceptual/mnemonic goodness-of-fit. Email: Javid Sadr, sadr@uleth.ca

6:00-7:30 PM (5021)

Attentional Engagement and Selection History Effects in the Three-Item Search Task. BRYAN R. BURNHAM, University of Scranton – Selection history effects in the three-item singleton search task (i.e., priming of popout [PoP], distrator preview effects [DPE]) have been through to reflect (a) feature pre-activation from the previous target, (b) biased selection toward features of the preceding target; (c) post-selection, facilitated retrieval, or some combination of these mechanisms. Additionally, selection history effects emerge only when the task requires focused attention to the target: PoP and DPE are absent in target simple detection and localization tasks but emerge in compound search tasks. The present study employed diffusion modelling to examine attentional engagement in the three-item singleton search task on decision bias (z), evidence accumulation (v), and post-decision processes (t0). In tasks not requiring target selection, neither PoP nor DPE emerged in RTs or in the diffusion model parameters; whereas target selection elicited PoP and DPE in both RTs and in specific parameters. Results suggest DPE reflects bias in the attentional decision, whereas PoP may reflect several processes.

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6:00-7:30 PM (5022)

A Miss in the Subsequent Search Miss (SSM) Effect: Proper Quantification of an Important Phenomenon in Visual Search. PATRICK H. COX, George Washington University, STEPHEN H. ADAMO, University of Central Florida, COURTNEY L. PORFIDO, DWIGHT J. KRAVITZ, and STEPHEN R. MITROFF, George Washington University - Subsequent search miss (SSM) errors, where observers are prone to miss a second target after finding a first, are well documented in academic radiology and cognitive psychology. This phenomenon has critical implications in real word scenarios, such as radiology, where missing a target can be fatal. Cognitive psychologists have sought to study the mechanisms underlying SSM errors with simplified and randomly generated displays, but the most widely used SSM measures have contained a circularity that inflates error estimates (Adamo et al., 2019). Specifically, SSM errors were often defined as the difference between the hit rate for a second target on dual-target trials and the hit rate on singletarget trials. However, in dual-target displays, the easier target is likely to be found first. Consequently, second-target data are biased to come from a harder distribution compared to singletarget data. We previously proposed an analysis method using matched displays to remedy this bias. The current set of studies revisits how a number of factors such as time pressure, trial type proportions, and target-distractor salience manipulations, influence the SSM effect using this unbiased measure. Email: Patrick H. Cox, patrickcox@gwu.edu

6:00-7:30 PM (5023)

Past Is Prologue: The Prior Target Location Attracts Overt Eye Movements During Search. TRAVIS N. TALCOTT and NICHOLAS GASPELIN, Binghamton University, SUNY (Sponsored by Nicholas Gaspelin) - Recent theories of visual search suggest that visual attention can be unconsciously guided by recent experience (called selection history). One such example of this implicit guidance is a phenomenon called location priming, whereby attention is automatically biased to return to the previous location of the search target. Problematically, previous demonstrations of location priming have relied on indirect measures of attentional allocation, such as manual response time. The current study assessed priming by measuring the destination of first saccades, which provide a more direct measure of attentional allocation. Participants performed a simple visual search task, in which the target appeared at a randomly selected location. First saccades

were much more likely to be directed to the location that was primed by the target from the previous trial than to the average unprimed location: an oculomotor location priming effect. These results suggest that recent experience can strongly influence attentional allocation during search.

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6:00-7:30 PM (5024)

Visual Search in a 2D Display with Pictorial Depth Cues. THOMAS G. GHIRARDELLI, CLAIRE FRASER, KATHRYN MONTHIE, HANNAH RUBIN, MATTHEW WOODSON, ELISHA LION, YANIE WILLIE, ZOE BRODSKY, WENG YEE MOOI, ELEANOR STRUEWING, JOLIE PRICE, and AURIANE VACHER, Goucher College - Previously we tested specific predictions made from traditional 2D visual search tasks in a novel task that required participants to directly interact with stimuli in a 3D environment by retrieving a predefined target among a set of LEGOs randomly distributed on a tabletop. We measured retrieval time as a function of set size for either a color feature search or a conjunction of size and color and found results similar to typical 2D visual search tasks. In the current study participants performed a traditional search task using digital photographs of the same LEGO displays on a standard 2D computer display, but because the sides of our display box appear in the picture, powerful pictorial depth cues emerge. We found results consistent with traditional visual search tasks. Further studies are planned to investigate the effect of other factors (e.g., depth and size) in search tasks using these stimuli.

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6:00-7:30 PM (5025)

Re-Examining Tmt Performance Costs Using the Milo Task. IAN M. THORNTON, University of Malta, TODD S. HOROWITZ, National Cancer Institute - The cost of alternating between digits and letters in the Trail Making Task, version B (TMT-B), is widely used to measure executive function, assuming that the cost is due to set-switching. However, evidence for this assumption is mostly correlational. Here, we use the tablet-based Multi-Item Localisation (MILO) task to directly measure responses to each item in a sequence. Displays contained the letters A-F and the digits 1-6, randomly distributed. In sequential blocks, letters were tapped in order before digits (or vice versa). In mixed blocks, character sequences alternated. Initial sequential block responses were elevated for both sequences and subsequent RT slopes were unaffected if characters vanished when touched or remained on the screen. Mixed block RTs, however, grouped in successive fast-slow pairs (A-1, B-2) giving a distinctive saw-tooth pattern, and were markedly slower on remain trials. Recursive chunking in working memory, rather than set-switching, may better explain the TMT-B bottleneck.

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6:00-7:30 PM (5026)

The Influence of Objects' Category and Labels Acquisition on Visual Search Performance. MAXIM MOROZOV, *RANEPA* (Sponsored by Vladimir Spiridonov) – We know that categorical information of objects could influence visual search (Meyer et al., 2007). However, the mechanism of such influence remains unknown. In our study, we would like to figure out the role of categorical labels in guidance of attention during visual search. We hypothesized that categorical labels could be used to select relevant information and facilitate visual search. In our experiment, participants perform visual search in two within group conditions (experimental group): when they have acquired categories and categorical labels for half of experimental categories and when they have acquired categories only and have not acquired labels for another half of experimental categories. In control group, participants have not acquired categories and their labels before visual search task. The results show that in experimental group participants perform visual search of a target without label among distractors without labels faster, than among distractors with labels. In control group, the difference between those conditions was not significant

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6:00-7:30 PM (5027)

Within-Participants Comparison Between Visual and Memory foraging. JUN SAIKI and SHUNSUKE KUMAKIRI, Kyoto University (Presented by Jun Saiki) - Previous studies have shown that the optimal foraging theory can account for both visual and memory search behavior with multiple targets. However, it remains unclear whether a common mechanism is involved in visual and memory foraging. To address this issue, we performed within-participants comparison of visual and memory foraging. Participants performed a visual foraging task and a semantic fluency task. In the visual foraging task, each search display contained unknown number of targets, and participants maximize the number of searched targets by switching search displays. In the semantic fluency task, they produced words belonging to various semantic categories. The scores of these tasks showed no correlation. To evaluate optimality of visual and memory foraging, we also compared the visual foraging task with a letter fluency task, in which participants produced words by explicitly switching categories. The correlation of search optimality between visual and memory foraging will be discussed.

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6:00-7:30 PM (5028)

Motor Outputs -- But Not Mere Preparation of Actions -- Affect Subsequent Visual Perception. XIAOJIN MA and RICHARD A. ABRAMS, *Washington University in St. Louis* (Sponsored by Richard Abrams) – Previous studies have shown that simple actions toward an object cause people to allocate attention preferentially toward properties of that object in subsequent unrelated tasks, referred to as the action effect. The present study examined the specific stage of action that produces the enhancement of attention--specifically, whether mere preparation of an action can produce effects similar to that of a produced action. Participants performed a modified version of an action effect paradigm, where each trial consisted of an action task and a visual search task. The action task sometimes contained a countermanding signal that indicated that the prepared action should be canceled. Our results replicated previous findings by showing that produced actions benefited visual search for objects in the same color as the action-task target, whereas the prepared but successfully withheld actions did not, indicating that actual motor outputs are necessary for action to affect attention.

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6:00-7:30 PM (5029)

Threat Improves Performance in a Goal-Directed Visual Search Task. ANDY JEESU KIM, DAVID S. LEE, and BRIAN A. ANDERSON Q, Texas A&M University - Increased anxiety has consistently been found to potentiate attentional capture by physically salient stimuli. However, a recent study demonstrated that a threat manipulation reduces attentional capture by reward-associated stimuli, suggesting that anxiety does not increase distractibility or otherwise interfere with the control of attention generally. Here, we experimentally induced anxiety via threat-of-shock in the adaptive choice visual search task to examine whether the experience of threat influences goal-directed visual search. Participants chose to search through one of two task-relevant colors on each trial, where searching through the less abundant color would be optimal for maximizing performance. Performance was evaluated with and without the threat of unpredictable electric shock in a withinsubjects design. Under threat, participants were significantly more optimal in their visual search and also missed significantly fewer targets. Performance improvements were demonstrated on trials that the optimal target color switched, demonstrating that threat is beneficial in appraising new environments. Email: Andy Jeesu Kim, jskim628@tamu.edu

6:00-7:30 PM (5030)

Can Grammar Influence Perception? The Effect of Combinatorial and Non-Combinatorial Labels in a Visual Search Task. FENNA POLETIEK and ASTRID AERNOUDTS, Leiden University (Presented by Fenna Poletiek) - The current study examines whether perceptual recognition of objects in a conjunction visual search task is influenced by the type of labels assigned to a particular object. With an artificial language, we created two conditions: In the combinatorial label condition an object is named with two non-words representing its features (e.g. colour and shape). In the non-combinatorial label condition, an object is named by a single unique nonword, which cannot be decomposed into an object's features. Participants showed facilitation (faster reaction times) in the non-combinatorial label condition, but only at the beginning of the experiment. However, over time, this trend changed; participants became faster in the combinatorial label condition. Our findings suggest that it might be more effortful to combine unknown labels at the start of the experiment, but as learning occurs, combining labels becomes more efficient than having a single label for each item. This may reflect how children learn language; At first, children may resort to one-to-one mapping of words to objects. However, as their vocabulary expands, it becomes more efficient to combine labels to describe objects. Email: Fenna Poletiek, poletiek@fsw.leidenuniv.nl

6:00-7:30 PM (5031)

Dual-Task Performance as an Insight into the Impact of Novel Pilot Rotorcraft Display System on Situational Awareness. SAMINEH GILLMORE, University of Alabama in Huntsville, KELLY DICKERSON and BRADLEY DAVIS, US Army Data and Analysis Center, DEREK MILLARD, University of Alabama in Huntsville (Sponsored by Peter Gerhardstein) -Degraded visual environments, situations where weather, dust, or other obscurants impact visibility, are among the top safety risks in rotorcraft operation. Mitigating risks of DVE is critical for improving operational safety. This study examines how informational complexity and visual density of elements in a pilot's display impact the ability to locate targets on the ground while maintaining awareness of aircraft state. The present study employs a modified dual task paradigm, on every trial pilot: (1) monitor aircraft state information and (2) scan the ground for a "T" target. Aircraft state questions are randomly presented after a subset of trials to assess pilot situational awareness while searching. We found that adding visual elements generally improved target detection performance. Information recall about the aircraft was correlated with search; successful recall was more likely to occur when the probe came after correct target detection than incorrect target detection. Email: Samineh Gillmore, sch0022@uah.edu

6:00-7:30 PM (5032)

Evaluating the Target Template Theory in a Real-World Search Design: A Mobile Eye-Tracking Study. GRACE NICORA, DAVID ALONSO, AYDIN TASEVAC, JEFFREY ORREGO, and TRAFTON DREW, University of Utah (Sponsored by Jeanine Stefanucci) - Visual search is a prominent aspect of our lives and has been extensively studied. Previous work focused on both our ability to encode distractor information as well as how the type of target may influence that encoding. We created a real-world visual search task to directly test two types of search targets. Participants either searched for the same object over multiple trials (consistent mapping), or they searched for a new object on each trial (variable mapping). Following the search trials, we tested participants' memory for the distractor objects from the environments. Although overall accuracy was lower than expected, d' was significantly higher in the variable than consistent condition. Consistent with prior work, longer dwell time on distractors was associated with better subsequent recall, but this effect did not interact with search task. Our findings suggest that search task is an important determinant for how distractors are encoded into long-term memory. Email: Grace Nicora, glnicora@gmail.com

6:00-7:30 PM (5033)

Eye Movements Reveal Expertise Effects on Memory for Complex Targets in a Visual Search Task. KINNERA S. MATURI and HEATHER SHERIDAN, *University at Albany*, *SUNY* – To investigate expertise effects on memory for complex visual search targets, we contrasted the eye movements of expert musicians (>10 years of music experience) and novices (who could not read music) during a music-related visual search task. Specifically, participants searched for a "search target" (a target bar of sheet music) within a "search array" (a larger music score containing the target). The search template was either presented simultaneously with the search array (i.e., the simultaneous condition) or prior to the search array (i.e., the sequential condition). Novices had lower accuracy overall, and novices (but not experts) had lower accuracy in the sequential relative to the simultaneous condition. As evidence that experts had a more precise working memory representation of the search template, they had fewer dwells than novices on the search template. Our results coincide with expertise findings from other domains, and we provide support for chunking/template theories of expertise.

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6:00-7:30 PM (5034)

Effects of Actual Versus Expected Task Difficulty on Search Behavior. NATALIE A. PAQUETTE, COREY BOHIL, and JOSEPH SCHMIDT, University of Central Florida (Sponsored by Corey Bohil) - In anticipation of a difficult search, observers encode more target related visual details, which affects later search performance (Schmidt & Zelinsky, 2017). To disambiguate effects of expected, versus actual search difficulty, the present study examined eye-movements as participants performed blocks of easy, moderate, or difficult search trials, with interspersed catch trials from the unexpected levels of search difficulty. Replicating previous work, actual search difficulty decreased accuracy, and increased time spent searching for and verifying targets. Easy search accuracy was at ceiling, despite expectations; however, performing a moderate search, but expecting a difficult search, increased accuracy. Whereas, performing a difficult search, but expecting an easier search, decreased accuracy. As expected, search difficulty increased, so too did time spent fixating distractors. This suggests separate contributions of expected, versus actual search difficulty. Expectation primarily influences target detection and distractor rejection, consistent with previously observed changes in encoded visual details of targets.

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6:00-7:30 PM (5035)

The Effect of Information Load in Visual Search for Ground Targets During Rotorcraft Operation. KELLY DICKERSON, US Army Data and Analysis Center, SAMINEH GILLMORE, University of Alabama in Huntsville, BRADLEY DAVIS, US Army Data and Analysis Center, DEREK MILLARD, University of Alabama in Huntsville - Degraded visual environments, situations where weather, dust, or other obscurants impact visibility, are among the top safety risks in rotorcraft operation. Mitigating risks associated with DVE is critical for improving operational safety. This study examines how systematically increasing information influences target search performance on a novel pilotage display. Pilots searched for ground targets in pre-recorded flights with three information load conditions applied: IR (infrared image), IR with symbology, and IR with symbology and terrain visualizations. Information load of the display manipulations was examined for both cockpit display and helmet mounted display (HMD) conditions. Overall there was a linear increase in reaction time as information load increased. Reaction times were faster and sensitivity to targets (d) was better for the HMD compared to PMD condition. The relationship between d and reaction time will be discussed in both a theoretical and applied context.

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6:00-7:30 PM (5036)

Effectiveness of Body Analogy for Mental Rotation in the Oldest-Old People. HIROYUKI MUTO, Ritsumeikan University, YASUYUKI GONDO, Osaka University, HIROKI INAGAKI and YUKIE MASUI, Tokyo Metropolitan Institute of Gerontology, TAKESHI NAKAGAWA, National Center for Geriatrics and Gerontology, MADOKA OGAWA, Tokyo Metropolitan Institute of Gerontology, WATARU ONOGUCHI, Waseda University, YOSHIKO ISHIOKA, Keio University, KEITARO NUMATA, Osaka Seikei College, SAORI YASUMOTO, Osaka University - Mental rotation ability declines with age. Given a previous finding that likening a tobe-rotated object to a human body improves mental rotation performance in young adults, we examined whether such body analogy helps the oldest-old people perform mental rotation. We also tested whether body analogy effectiveness is age-related. In the present study, 467 community-dwelling older people (age range: 86-97 years; 242 males and 225 females) performed a paper-and-pencil mental rotation test that comprised one question for abstract objects and one for human-like objects. The results revealed more participants correctly answered the question on human-like objects (31.3%) compared with that on abstract objects (18.6%), indicating that body analogy is effective in the oldest-old. Of importance, age-related change in body analogy effects was found. While accuracy in the mental rotation of abstract objects declined with age, accuracy for human-like objects was preserved with age. This suggests the possibility that age-related decline in a spatial ability can be compensated for by using a familiar design like a human body. Email: Hiroyuki Muto, h.muto@zm.commufa.jp

6:00-7:30 PM (5037)

Orienting Cue, Perspective Shift, and Pointing Quadrant Affect Perspective Taking. PERI GUNALP, MARY HEGARTY, and ELIZABETH R. CHRASTIL, University of California, Santa Barbara (Sponsored by Mary Hegarty) -The type of orienting cue in a spatial perspective taking task matters; agency, interactivity, and directionality of the cue are important to consider. The present work compares the effects of a human figure (which has agentive and directional properties) to an arrow (directional properties only), while systematically varying magnitude of initial perspective shift and pointing quadrant. Results suggest that both a human figure and an arrow reduce error and response time relative to a control condition. Performance with human figures and arrows is equivalent, suggesting that directionality of the cue is most critical. In general, perspective taking is faster and more accurate when the initial perspective shift is small and when pointing to the front quadrant. There was no interaction of cue type with perspective shift or pointing quadrant, indicating that the cue provides a general benefit to perspective taking regardless of the angular deviation between current and imagined perspectives. Email: Peri Gunalp, pgunalp@ucsb.edu

6:00-7:30 PM (5038)

Think3D!: How Spatial Visualization Impacts Elementary Students' Math Learning. HEATHER BURTE, University of Texas, Arlington, ELIZABETH C. MCCALL, Tufts University, ALLYSON HUTTON, Think3d!, HOLLY A. TAYLOR, Tufts University - The promising connection between spatial thinking and STEM learning has sparked increased interest into spatial interventions for elementary students' math learning. Given the range of spatial skills, the methods of teaching those skills, and the variety of mathematical concepts, many details of this connection remain unknown. We propose the need for a more fine-grained analysis to understand how spatial skills training relates to specific mathematical concepts/problems. To facilitate this, we developed a math categorization. We used this categorization to compare the impact of a spatial visualization intervention, called "Think3d!", to an active control group on spatial and mathematics measures. The math categorization revealed that improvements on math problems that negligibly involve spatial thinking were predicted by improvements on two spatial measures. Further, spatial visualization improvements via Think3d! predict mathematical reasoning improvements. Contrary to our predictions, spatial visualization changes better predicted gains in those problems that negligibly involve spatial thinking.

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6:00-7:30 PM (5039)

Asymmetries in Hemi-Image Generation: How Do Handedness and Reading/Writing Direction Matter? OMAR GARCIA, NAFISEH FAGHIHI, KARINA FEBRE, and JYOTSNA VAID, Texas A&M University (Sponsored by Jyotsna Vaid) - Previous research suggests that spatial biases in perception or graphic production tasks are affected by biomechanical, cultural, and/or biological factors. In an earlier study, we examined spatial biases on a novel task, hemi-image generation (Garcia et al., 2018), and found that English (leftto-right) readers generated a majority of left side hemi-images, but this effect was only present among left-handed participants. The purpose of this study was to probe the basis of hemi-image generation side preferences by considering hand movement biases associated with use of the dominant vs. non-dominant hand and also to compare the performance of left-to-right vs. right-to-left readers (including right- and left-handers). To reach this goal, English and Farsi (right-to-left) readers were asked to draw half objects using either their dominant or nondominant hand. We found evidence of a complex combinatory effect when handedness and reading/writing direction align. We also found instances in which ease of drawing drove drawing preferences. Findings are further discussed in terms of relevant spatial bias theoretical frameworks.

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6:00-7:30 PM (5040)

Testing the Limits When Taking Avatar's Perspective: Deviating Hand Positions Between Actor and Avatar. JOCHEN MÜSSELER, *RWTH Aachen University* – In virtual environments, we often interact with avatars and take the world from their perspective. In previous studies we examined a situation, in which an actor observes and controls an avatar from different spatial perspectives. The avatar was presented in top view on a display and its perspective was varied by different angles of rotation relative to the actor. In this case, the spatial stimulus-response relationships from the avatar's perspective could deviate from the actor's perspective. Therefore, compatibility tasks were used to determine which stimulusresponse relationship determines compatibility, the perspective of the avatar or the perspective of the actor. The results showed that stimulus-response compatibility went with the avatar, and not with the actor (Müsseler, Ruhland & Böffel, 2019; Böffel & Müsseler, 2019). In the present experiments aimed to test the limits of taking avatar's perspective. Participants and/ or avatars performed a compatibility task with uncrossed or crossed hands. To our surprise, this did not affect the spatial compatibility effect.

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6:00-7:30 PM (5041)

The Effect of Spatial Scale When Teleporting Through Virtual Environments. ALEX F. LIM, LUCIA A. CHEREP, JONATHAN W. KELLY, ALEC G. OSTRANDER, and STEPHEN B. GILBERT, Iowa State University (Sponsored by Jon Kelly) - Virtual reality (VR) systems typically allow users to walk and turn, but virtual environments (VEs) often exceed the available walking space. Teleporting has become a common locomotion interface, whereby the user aims a laser pointer indicating the desired location, and sometimes orientation, in the VE before being transported without self-motion cues. This study evaluated the influence of rotational self-motion cues on spatial updating performance when teleporting, and whether the importance of rotational cues varies across movement scale and environment scale. Participants performed a triangle completion task by teleporting along two outbound path legs before pointing to the unmarked path origin. Rotational selfmotion improved performance across all levels of movement scale and environment scale. The importance of rotational selfmotion was exaggerated when navigating large triangles and when the surrounding environment was large. These results indicate that rotational self-motion cues are important when teleporting, and that smaller VEs can improve navigation. Email: Alex F. Lim, aflim@iastate.edu

6:00-7:30 PM (5042)

Seeing the World Through the Eyes of an Avatar? Comparing Perspective Taking and Referential Coding. SOPHIA RUTH VON SALM, KATHARINA BOLZIUS, and JOCHEN MÜSSELER, *RWTH Aachen University* (Sponsored by Jochen Müsseler) – Previous studies have shown that users spontaneously take the position of a virtual avatar and solve spatial tasks from avatar's perspective. The common impression is that users develop a spatial representation that allows them to "see" the world through the eyes of the avatar, that is, from its virtual perspective. In the present paper, this perspective taking assumption is contrasted with the referential coding assumption that allows the users to act on the basis of changed reference points. Using a spatial compatibility task, Experiment 1 demonstrates that the visual perspective of the avatar is not the determining factor for taking avatar's spatial position, but that its hand position (as the reference point) is decisive for the spatial coding of objects. However, participant's own hand positions can overwrite this referencing (Experiment 2). Email: Sophia Ruth von Salm, salm@psych.rwth-aachen.de

6:00-7:30 PM (5043)

The Development of Spatial Perspective Taking in Young Children. QI WANG and WEIJIA LI, Sun Yat-Sen University, YINGYING YANG, Montclair State University (Presented by Qi Wang) - Spatial perspective-taking refers to the ability to mentally represent a viewpoint different from one's current perspective. The present study investigated the development of spatial perspective-taking of young children (5- to 7-year-old) by using a modified spatial perspective-taking task. Participants were asked to recognize spatial layouts from a child actor's perspective (other-perspective) or their own perspective by imagining sitting on an empty chair (self-perspective). The child actor or the empty chair was placed in different orientations from the initial viewpoint. Generally, performance improves as a function of age and decreases with increasing orientation disparities. The results suggest that even 5-year-old children could recognize spatial scenes from different orientations based on the egocentric perspective, while it is difficult for younger children (5-6 year-old) to manipulate spatial representations from other person's perspective, especially with a large orientation disparity. The findings indicate that although younger children may have been capable of recognizing spatial scenes from different orientations, this ability might be impacted by the development of adopting another person's perspective. Email: Qi Wang, wangq227@mail.sysu.edu.cn

6:00-7:30 PM (5044)

Movement Experience and Balance Affect Performance on a Virtual Triangle Completion Task. ERICA BARHORST-CATES, SARAH CREEM-REGEHR, and JEANINE STEFANUCCI, University of Utah (Sponsored by Sarah Creem-Regehr) - Both vision and body-based information contribute to spatial updating, which is the ability to keep track of one's position in an environment. However, there are mixed results regarding their relative contributions. We tested sensorimotor dependence in spatial updating in female expert dancers and non-dancers using a virtual triangle completion task. We varied the presence of body-based and visual information with three locomotion methods-walking, joystick, and teleporting and also included tests of balance ability and mental rotation. Participants were least accurate in updating their spatial location with teleporting but showed similar accuracy for walking and joystick. Variability was lowest for walking. Accuracy did not differ based on dance expertise, but dancers were slower to respond in the non-walking conditions. Balance ability predicted performance on mental rotation and in the teleporting condition. These results suggest that trained movement experience may lead to the use of different strategies for spatial updating.

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6:00-7:30 PM (5045)

Knowledge of Environmental Boundaries and Its Influence on Blind-Walking Distance Judgments. LINDSAY HOUCK and KILEY TIMMONS, George Washington University, JOHN PHILBECK, George Washington University (Sponsored by John Philbeck) - Egocentric distance judgments indicated by blindwalking often become compressed when space is limited. Thus, many blind-walking studies provide plenty of room behind the farthest target distance so responses will not be constrained by environment size. Here we tested if blindfolded walking is constrained by the observer's knowledge of the environmental geometry even when the boundaries are beyond the walking path. Participants (n=34) viewed two stimuli in a frontoparallel plane (.75-1.5m) and indicated the exocentric target separation by walking blindly, either forward towards the stimuli, or after turning 90 degrees to the left. They stood either 4m, 5m, or 6m from the left wall and always stood 5m from the stimuli. When turning left, participants walked systematically less as the room to walk decreased. There were no differences when walking forward. A control experiment ruled out turning as a factor underlying the systematic undershooting. This shows that for exocentric walking, observers' responses are sensitive to the environmental geometry, even when the boundaries are well removed from the walking path. This has implications for interpreting the results of walking as indications of exocentric intervals in past work.

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6:00-7:30 PM (5046)

Travel Direction as a Fundamental Component of Human Navigation. YOU (LILIAN) CHENG, University of California, Santa Barbara, SAM LING and CHANTAL E. STERN, Boston University, ANDREW HUANG and ELIZABETH R. CHRASTIL, University of California, Santa Barbara (Sponsored by Elizabeth R. Chrastil) - In daily life, one's travel direction is typically correlated with one's head direction, but from first principles, these two factors can offer different spatial information. Although head direction has been found to be a fundamental component of human navigation, it is unclear whether travel direction plays a primary role in the navigation process. To test this question, we used a visual motion adaptation paradigm. Adaptation phase: visual self-motion toward a cardinal direction in a virtual hallway. Test phase: a series of visual back and forth movements, toward and away, from the initial cardinal direction. In both phases, the heading direction was alternated occasionally to dissociate heading from the travel direction. We then asked subjects to report their net travel direction, acquiring psychometric functions for perceived travel direction. Interestingly, we found an aftereffect wherein subjects had a higher frequency of reporting net travel toward the adapted direction, compared to a no-adapt condition. These findings support our hypothesis that travel direction is a fundamental component of human navigation, and suggest non-opponent processes underlie the computation of travel direction.

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6:00-7:30 PM (5047)

Incidental Encoding of Geometry in Auditory-Based Spatial Reorientation. SAM CARPENTER, SOMER JOHNSON, GREG GILLILAND, VIVEKA MELO, and DANIELE NARDI, Ball State University - Studies in spatial navigation have found that when participants are given landmarks to reorient, they also incidentally encode the geometric shape of the environment. However, these studies have focused primarily on visuallyguided reorientation. Here we explored if the same pattern of results emerges with auditory-based reorientation. Forty-one blindfolded, sighted participants had to encode the location of a target clipped to one side of an octagonal arena in a real-world task. The only cue available to solve the task was a rectangular array of four speakers (auditory landmarks) generating distinct sounds. Participants learned the task, confirming that auditory cues can support reorientation. Crucially, in a subsequent test, all the speakers generated the same sound; thus, a landmark strategy associating a specific sound to the target location could not be used. Participants showed that they had encoded the geometric shape of the auditory array, even though it wasn't necessary for the task. This is the first piece of evidence extending incidental encoding of geometry to auditory cues, and it supports the theory of functional equivalence: different encoding modalities support equivalent spatial representations and behavior.

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6:00-7:30 PM (5048)

Structural and Functional Analyses of Medial Temporal Lobe Regions in Recognition Memory. JAMIE SNYTTE and ABDEL ELSHIEKH, McGill University, STAMATOULA PASVANIS and SRICHARANA RAJAGOPAL, Douglas Mental Health Institute, ROSANNA K. OLSEN, University of Toronto, NATASHA RAJAH, McGill University (Sponsored by Natasha Rajah) - The dual process theory of recognition memory proposes that individuals can recognize a stimulus based on a sense of familiarity or a detailed recollection. Evidence suggests an anatomical distinction such that an anterior medial temporal lobe (aMTL) system supports familiarity, and a posterior medial temporal lobe (pMTL) system supports recollection. To assess how these two MTL systems support these distinct memory processes we tested 23 healthy young adults on an object location source memory task, which dissociates itemonly (familiar) and item-source memory (recollection), during an fMRI scan. High resolution T2 MRI images were also obtained from each participant. We used multiple linear regression to test how volume of regions within the aMTL and pMTL systems predicted the percentage of recollection and familiarity trials. We found that volume of regions within the pMTL system significantly predicted recollection accuracy (R² = .499 p = .004). Volume of regions in the aMTL system did not significantly predict the percentage of familiar or recollection trials. This finding provides evidence for the functional dissociation between these systems in recognition memory processes. Structure-function MRI analyses will be discussed. Email: Jamie Snytte, jamie.snytte@mail.mcgill.ca

6:00-7:30 PM (5049)

Magicians Shift Event Boundaries to Shape Awareness: The Case of Symmetry. ANTHONY S. BARNHART, DILLON J. KRUPA, ALYSSA N. RUEDIGER, and CHEYENNE DUCKERT, Carthage College - Magicians encourage audiences to interpret incomplete information using assumptions constructed from experience with environmental regularities. Symmetry is one such regularity. Deceptive actions may be more likely to evade detection if they are in a symmetrical action sequence. Symmetry has been stressed in a piece of sleight of hand known as the top change, wherein a playing card in one hand is switched for the top card of a deck in the other hand. If the greater action has mirror symmetry (i.e., the hand with a single card approaches the deck and then the hand with the deck retreats in the same direction of motion), the sleight may be harder to detect. We tested this hypothesis across three experiments, varying the symmetry of the action patterns and the viewing behaviors of participants. Participants watched top changes, reporting every switch they detected. Symmetry generally reduced accuracy and slowed RTs, but this tendency was not consistent across all forms of symmetry. We present evidence that symmetrical actions are perceived as a single event, whereas the asymmetrical actions are parsed as two separate events. This parsing influences attention to details near event boundaries.

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6:00-7:30 PM (5050)

Neurophysiological Markers of Event Boundaries in Simple Narrative Stimuli. BARBARA L. PITTS, HEATHER R. BAILEY, and MATTHEW G. WISNIEWSKI, Kansas State University - The segmentation of ongoing activity into discrete units is important for our perception and later memory of the activity; however, the neural mechanisms that underlie event segmentation and their timecourse are not well understood. We investigated the neurophysiological markers of definitive event boundaries, where one meaningful activity ends and another begins, within narrative picture sequences (Experiment 1: letters; Experiment 2: stick figure actions). Event boundaries, which were defined as a change in letter or a change in action (e.g., walking, running, jumping), evoked a larger N400 than non-boundaries. These results are consistent with the idea that the N400 reflects a mismatch between incoming perceptual information and predictions based on one's mental representation of what is happening now. These findings suggest that it may be possible to use the N400 as a covert measure of event segmentation.

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6:00-7:30 PM (5051)

Event Segmentation and Memory: Spatial Boundaries Enhance Learning Even in Virtual Environments. MATTHEW LOGIE and DAVID DONALDSON, *University of Stirling* –Event segmentation allows the continual flow of information experienced in life to be partitioned into distinct episodes. One basis on which experiences are segmented is the presence of spatial boundaries, such as walking through doorways. Findings have shown that event segmentation has a significant influence on memory. The present research capitalises on these findings to ask whether memory encoding can be enhanced, using event segmentation. We make use of a virtual environment to present lists of words in virtual rooms and manipulate the presence or absence of spatial boundaries. Across a series of experiments, we show that segmenting information with spatial boundaries in a virtual environment does result in more information being remembered during later tests of episodic recall. Importantly, the data highlights the importance of spatial boundaries for benefiting memory no improvement was present when events were segmented by (equivalent) gaps in time and a change of context. Results are discussed in relation to event segmentation theory, the benefits of learning within virtual environments, and whether memory encoding can be optimised using spatial boundaries alone. Email: Matthew Logie, m.r.logie@stir.ac.uk

6:00-7:30 PM (5052)

Events Organize Memory for Story Information. CHRISTOPHER A. KURBY, Grand Valley State University, HEATHER R. BAILEY and MAVERICK E. SMITH, Kansas State University, J. MAC STEWART, MADALINE MERLE, and TORI EVANS, Grand Valley State University - Readers of narratives tend to segment them into events. This segmentation process has been shown in past research to affect working memory updating and reading behavior. Here we tested whether event segmentation shapes the formation of long-term memory for event information. Participants read stories of historical events and then engaged in a verb arrangement task. In this task, participants were shown verbs from the story on a computer screen. They then arranged them into groups based on their understanding of the story. We found that verbs that shared an event were placed closer to each other than verbs from different events, controlling for measures of orthographic, textbase, knowledge, and situational similarity. This suggests that long term memory for story information is organized by events.

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6:00-7:30 PM (5053)

Event Conceptualization in English and Russian Monolinguals and Bilinguals. ANNA KATIKHINA and VICKY TZUYIN LAI, University of Arizona (Sponsored by Vicky Lai) - Verb aspect is a grammatical category that defines the temporal distribution of an event rather than the time when the event happened. In English, the perfective aspect (He washed the dishes) represents an event holistically and collapsed to its final stage. The imperfective (He was washing the dishes) emphasizes how the event unfolds. However, this dichotomy is not as clear-cut in all languages. We tested English and Russian monolinguals and bilinguals. Participants (N=160) were presented with images of in-progress and completed events. We found that English native speakers mostly used the perfective form to describe both types of events. Russian native speakers preferred imperfective over perfective forms (65.23% vs. 34.77%, p<.001). Bilingual speakers demonstrated patterns

aligning with monolingual speakers of their native language. We conclude that event representations are strongly influenced by native language grammar.

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6:00-7:30 PM (5054)

Event Segmentation and the Influence of Narrative Information Distributions in Interpretation Behavior of Ang Lee's Films. LINGFEI LUAN, Bowling Green State University (Sponsored by Richard Anderson) - In this work, we conducted an experiment to test Ang Lee's unique filmic expressions regarding event perception and cognition, as well as casual chains of narrative in five of his films: Crouching Tiger, Hidden Dragon (2000), Hulk (2003), Brokeback Mountain (2005), Life of Pi (2012), and Billy Lynn's Long Halftime Walk (2016). These five films were selected based on having a Gross profit. The purpose of this study is to explore how low-feature film construction techniques impact people's high-level conceptual activities and guide audiences' interpretations and preferences. Both event segmentation theory and causality in event-indexing models were tested by requiring participants to segment film events and recall shots one week after the first viewing. The experiment was designed based on the assumption that a film's narrative should tell a comprehensible story with reasonably constructed plot cues. The shots' positions and lengths were considered film expression techniques used by a filmmaker to try to construct a story's plot. The experiment's results support the hypothesis that each shot in Ang Lee's successful works was designed and filmed in a way to match a viewers' perception of a story's causal links.

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6:00-7:30 PM (5055)

Response-Response Binding: Representation of Complex Actions in Human Action Control. BIRTE MOELLER and CHRISTIAN FRINGS, University of Trier - Binding between stimulus features and between stimuli and responses has been discussed as a central mechanism in human action control: Carrying out a response to a stimulus leads to bindings between stimulus- and response features, so that repetition of one can retrieve the other later on. Intriguingly, all discussions to date focus either on stimulus-stimulus or on stimulus-response bindings. Here we argue that response-response bindings are equally relevant for action control, if binding really plays a role in action representation. We introduce a new paradigm and present evidence in three experiments (N=30; N=30; N=39) that the same kind of integration and retrieval as observed between stimuli and responses is also possible between two individual responses, pursuing different goals. The results have implications for the structure of human action representation, indicating binding of individual actions in higher order representations, and suggests that binding is an even more ubiquitous mechanism in action control than previously shown. Email: Birte Moeller, moellerb@uni-trier.de
6:00-7:30 PM (5056)

Investigating the Sense of Agency: How Voice-Control Affects Intentional Binding. LAURA SAAD and JANE ROTHROCK, Rutgers University - New Brunswick, JESUS DE LUNA, Rutgers University - New Brunswick, JULIEN MUSOLINO and PERNILLE HEMMER, Rutgers University - New Brunswick (Sponsored by Pernille Hemmer) – The sense of agency (SoA) is the subjective feeling of being in control over our actions and their associated outcomes. SoA is typically measured implicitly, via intentional binding (IB), or explicitly via self-report. IB is the perceived temporal compression between a voluntary action and its related outcome. We evaluate intra-individual differences in IB and explicit agency across two IB experiments. In Exp. 1, participants estimate the timing of a voluntary button press or audio clip. In Exp. 2, participants estimate the timing of their voice command or audio clip. In both experiments, explicit sense of agency is assessed using a self-report measure of participants' feelings of control. Congruence of outcome (i.e., whether the outcome is consistent with participants' expectations), timing interval between action and outcome, and inter-trial intervals will be varied. Implications and future research directions will be discussed.

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6:00-7:30 PM (5057)

Heuristic Influences on Memory for Event Duration. ERIN DOWLING, SANDRA HUNTER, JASON P. LEBOE-MCGOWAN, and LAUNA C. LEBOE-MCGOWAN, University of Manitoba - We investigated processes that underlie the reconstructive nature of memory for the duration of past events (Freidman, 1993), focusing on the generation and resemblance heuristics identified by Whittlesea and Leboe (2000). Reliance on the generation heuristic involves using the recollection of detail to infer the nature of past events. Independent of the actual prior duration of images, we separately manipulated the duration label and the frequency of changes that came to mind at the time of remembering and observed that both factors biased participants' duration memory judgments. Application of the resemblance heuristic involves inferring the nature of a prior event based on the features it shares with multiple other prior experiences. To test this influence, we manipulated the proportion of words presented for a longer vs. shorter duration during a study phase, depending on whether words belonged to a thematicallyrelated word list (Deese, 1959; Roediger & McDermott, 1995) or whether words were presented in a large vs. small font. In both cases, independent of their actual duration, participants judged the prior duration of words based on their resemblance (either perceptual or conceptual) to other words.

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6:00-7:30 PM (5058)

Abstract Concept Clusters Derived from Sorting and Property Listing Tasks. KATJA WIEMER and JAMES R. MOGAN, *Northern Illinois University* – Semantic memory is structured in ways that support easy access to relevant knowledge as required within a situation. Categories are a vital element of this structure; they support functions like inferences, reasoning, and attainment of goals. Abstract concepts (like justice, relation) are prevalent in reasoning and conversation related to everyday situations, but it has been a challenge to establish a category system for them. In two experiments, we attempted to empirically derive categories for the 200 most common abstract nouns in a bottom-up approach using a sorting (Exp. 1) and feature generation (Exp. 2) task. A hierarchical cluster analysis of the sorting data yielded fifteen interpretable clusters for this sample, with varying cohesion levels. Clusters were interpreted based on their content (Exp. 1) and corresponding features (Exp. 2). Both approaches yielded converging solutions for some but not all clusters. We discuss some unique emerging characteristics of abstract concept categories.

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6:00-7:30 PM (5059)

Context-Free Knowledge Partitioning in Categorization. LEE-XIENG YANG, National Chengchi University - In this study, it was examined whether people can spontaneously partition the category space and apply different representations for classifying items according to their positions not a context cue. To this end, the training items were arranged as four horizontal clusters with two of them in the upper-right corner and the other two in the lower-left corner in the space. These clusters corresponded to categories B, A, B, and A in top-down order along dimension y. However, dimension x cannot predict categories. Three types of transfer response patterns were consistently found in two experiments. First, the participants only relied on dimension y for categorization. Second, the participants relied on dimension y to choose a cluster and assign its label to the stimuli in the same side of it on dimension x and the contrasting label to those in the opposite side. The third pattern is the mix of the first two. Although the first pattern can also have an exemplar account, all three patterns can be accommodated by a generative model in knowledge partitioning framework.

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6:00-7:30 PM (5060)

The Impact of Exception Relevance on Category Representation. DANIEL SILLIMAN and KENNETH J. KURTZ, Binghamton University (Sponsored by Kenneth Kurtz) - Research on exception items in category learning often addresses recognition performance for training items that violate a category regularity. A related issue is the impact of exceptions on the internal structure of category representations. Specifically, to what extent do exceptions disrupt the withincategory compression effect that ordinarily arises from classification training? Exceptions are always distinct from category norms, but they may or may not be confusable with a contrast category. Exceptions which are seen as task-critical may be better integrated into the category representation. The resultant disproportionate weighting of the exception(s) could impact the homogeneity of the category representation. The present work systematically investigates the conditions under which exceptions are discounted relative to category norms or considered meaningful enough to impact category

representation (indexed via pairwise similarity). Additionally, formal models of category learning are tested for their ability to account for patterns observed in the behavioral data. Email: Daniel Silliman, dsillim1@binghamton.edu

6:00-7:30 PM (5061)

Dimensional Attention Shift During Semi-Supervised Category Learning. OSUNG SEO and MICHAEL KALISH, Syracuse University (Sponsored by Michael Kalish) - Perceived category structures can change over time with exposure to stimuli. As we accumulate evidence from each stimulus, our belief about the true category structure changes accordingly. Dimensional attention can shift from one dimension to another throughout this learning process. It is well established that dimensional attention can shift effectively when corrective feedback conflicts with the perceived category structure. However, it is not clear if dimensional attention can shift in the absence of feedback. In this study, we hypothesize that dimensional variability and divisibility of unlabeled item distributions can give rise to dimensional attention shift during semi-supervised category learning. We present the results from two experiments where the effects of dimensional variability and divisibility on dimensional attention shift are examined. These results have implications for understanding human category learning behavior outside the laboratory setup. Email: Osung Seo, oseo100@syr.edu

6:00-7:30 PM (5062)

Interleaving Is Better Than Blocking When Memorizing, but Not When Trying to Find a Rule. JERI L. LITTLE and ASHLEY LONGARES, California State University, East Bay -Whether interleaving or blocking is better for learning depends, in part, upon the nature of the to-be-learned materials. We suggest that when given a category-learning task amenable to either memorization or finding a rule, the ideal sequence for learning will depend upon one's strategy. In two experiments, participants studied letter-strings defined by a verbalizable rule pertaining to the last letter of the letter-string. Participants either studied these items in an interleaved or blocked manner. In Experiment 1, participants' strategy (finding a rule vs. memorizing) was self-selected; in Experiment 2, we instructed participants to find a rule or memorize. Both experiments showed that when using a memorization strategy, there was a benefit of interleaving over blocking for the classification of perceptually similar transfer items. Experiment 2, however, showed that when trying to find a rule, there was a benefit of blocking over interleaving for application of the rule. Individuals differ in the strategies that they use to learn, and the effectiveness of these strategies is influenced by the sequence of to-be-learned items.

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6:00-7:30 PM (5063)

Generalization of Within-Category Representations. ROSE DENG, University of Maine, RENEE SAVOIE, University of Maine, SAHVANNAH MICHAUD, University of Maine, OLIVIA STEVENSON, ANNA DRISCOLL, and DAVID SMITH, University of Maine, SEBASTIEN HELIE, Purdue

University, SHAWN ELL, University of Maine (Sponsored by Shawn Ell) - The way in which categories are learned may influence the development of category representations, which may influence the ability to generalize knowledge. Previous research suggests that learning differences between members of contrasting categories (between-category representations) can be transferred along a single dimension, opposed to learning commonalities within categories (within-category representations). Recent data, however, suggests that betweencategory representations are actually limited compared to withincategory representations, which support both generalization to novel stimuli and tasks. The extent to which category representations can be generalized along a single dimension were further explored. Subjects were trained on classification or inference training and tested on inference. Results suggested that inference training supported generalization to novel stimuli during test compared to classification training. Thus, when commonalities within categories are emphasized and learned in inference training, subjects may be better equipped to transfer learned information to novel stimuli. These data extend our understanding of the limitations and utility of different category representations in novel situations.

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6:00-7:30 PM (5064)

Exposure Versus Training During Family-Resemblance Category Learning by Children with and Without Autism. BARBARA ANN CHURCH and BROOKE N. JACKSON, Georgia State University, CHRISTOPHER J. LOPATA, Canisius College, EDUARDO MERCADO, University at Buffalo -Research suggests that children with autism spectrum disorder (ASD) may learn and generalize family-resemblance categories atypically (e.g. Church et al., 2010, 2015), and they also show deficits in learning from observation (e.g. Foti et al., 2014). To better understand these deficits in children with ASD, we conducted two experiments. Experiment one compared the ability of typically developing (TD) children in three age groups (6-7, 8-9, & 10-12) to learn novel family-resemblance categories when trained with direct feedback (trained) versus when they were exposed to the training stimuli but not asked to categorize or given any feedback about category membership (exposure learning). Experiment two made the same comparison in school-aged children with ASD. Our findings suggest that children with ASD have significant difficulty learning perceptual categories from exposure while even young TD children do not. The results are discussed in terms of the possible role of perceptual learning deficits in ASD.

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6:00-7:30 PM (5065)

Juxtaposition During Training Induces Category-Specific Effects on Accuracy and Feature Attention. SAFA R. ZAKI, Williams College, CLAIRE BERGEY, University of Chicago, ISABELLA SALMI, Williams College, ALEXANDER RICH, New York University – Recent research has demonstrated that order of training exemplars can impair or enhance category learning. What mechanism explains these effects? One account posits two learning systems, each engaged by different task orderings and category structures (Noh, Bjork, & Maddox, 2016). Another hypothesizes that the interleaving of categories juxtaposes them, thereby drawing attention to the features that distinguish them (e.g., Birnbaum, Kornell, Bjork, & Bjork, 2013; Carvallo & Goldstone, 2014; Zaki & Salmi, 2019). We tested whether different order effects can be induced in a single task. Participants learned three categories, two of which were more interleaved and one which was more blocked, in a single sequence. At test, participants more accurately identified members of the interleaved categories. Such an interleaving advantage for specific categories within a task contradicts the two-system account, which explains order effects by a task's engagement of a specific system. In subsequent evetracking studies, we find evidence of increased attention to features which distinguish the interleaved categories. Our results favor an account of order effects by juxtaposition's guidance of attention to locally discriminating features. Email: Safa R. Zaki, szaki@williams.edu

6:00-7:30 PM (5066)

Exponential Generalization in Unsupervised Categorization. JOHN P. CLAPPER, SAVANNAH GARTHWAITE, JESSE VENTURA, MATTHEW APPEL, and NAZARET MONTEJANO, California State University, San Bernardino - It is often assumed that human categorization is based on similarity, but much research has shown that people do not categorize on the basis of overall similarity in laboratory sorting tasks. Recently, Clapper (2017, 2019) showed that people would categorize on the basis of certain forms of similarity in a novel label generation task, i.e., that they would give similar objects the same labels and dissimilar objects different labels in this task. Here, we report data showing that the probability of assigning objects to the same category (giving them the same label) declines exponentially with their psychological distance (dissimilarity), in accordance with Shepard's (1987) universal model of generalization. This result holds for both one- and two-category structures, suggesting considerable generality. We then describe a computational model of free categorization that can accommodate these results, outline its major predictions, and show how the model differs from standard choice-based models of categorization.

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6:00-7:30 PM (5067)

Effects of Incomplete Memorization in a Model of Category Learning. TOSHIHIKO MATSUKA, *Chiba University*, YOSHIKO KAWABATA, *National Institute for Japanese Language and Linguistics*, KUANGZHE XU, *Chiba University* – Dropout is a widely-used technique in deep neural networks to prevent over-generalization. When dropout is applied, randomly selected nodes or neurons are removed from a network. Although dropout is invented in the field of machine learning, its process is intuitively similar to human cognitive processes, i.e., incapable of fully memorizing or recalling past events. The present study applied dropout (incomplete memorization) to a model of category learning. In particular, we examined the effects of incomplete memorization on (a) association weights between exemplars and categories, (b) attention weights, and (c) categorizations of exceptions. The results of simulation studies showed that when a model has a limited memory capacity, (a) exemplars that are close to the category boundary have weaker association weights with categories than a model with full memory capacity, (b) attention learning was enhanced, and (c) exceptions were generally ignored but had valid associations. Email: Toshihiko Matsuka, Matsuka.toshihiko@gmail.com

6:00-7:30 PM (5068)

Two-Dimensional Semi-Supervised Learning: Experiment. **JOHN** А Computational D. PATTERSON and KENNETH J. KURTZ, Binghamton Kenneth Kurtz) University (Sponsored by Behavioral studies of semi-supervised learning show that the category representations acquired under supervision are modified in a principled way based on unsupervised exposure. Formal models of human category learning have not been extended to explain such effects. We compare the ability of two theoretically distinct models to account for a new set of behavioral semi-supervised data. We used a supervised-pretestunsupervised-posttest design with a 2D category structure (items of each category on parallel diagonal lines); the lines were made either steeper or flatter between the supervised and unsupervised phases. ALCOVE (an exemplar-based model) and DIVA (based on goodness-of-fit to a learned statistical representation of each category) were fit to the behavioral training, pre-test, and post-test data on the same learning problem (which showed people's representations shifted steeper or flatter, consistent with condition, between pre-test and post-test). We found that DIVA provided a better overall fit to the human data. Implications of these findings for semisupervised learning research and theories of category learning are discussed.

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6:00-7:30 PM (5069)

Exposure to Short-Term Acoustic Regularities Has Limited Impact on Representations and Behavior. CASEY L. ROARK and LORI L. HOLT, Carnegie Mellon University (Sponsored by Lori Holt) - Recent research suggests that auditory processing rapidly and efficiently codes correlations between acoustic dimensions experienced through passive exposure. We investigated how exposure to short-term regularities changes representations and categorization behavior in humans. In Experiment 1, we observed that passive exposure to a correlation between two acoustic dimensions had limited influence on similarity-based representations. In Experiment 2, we found that, early in category learning, behavior and strategies differed based on the relation between a passively-experienced acoustic dimension correlation and the nature of categories being learned. However, there were large and persistent differences in performance based on the whether the distinction between the categories required a positively-sloped boundary or a negatively-sloped boundary in the two-dimensional acoustic input space. These experiments demonstrate that the impact of short-term exposure to acoustic regularities has limited impact

on perceptual representations or behavior, and that other perceptual biases may place stronger constraints on the course of learning.

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6:00-7:30 PM (5070)

Capuchins (Cebus Apella) Categorize Known Conspecifics According to Facial Dominance. ASHLEY MICHELE MEACHAM, MEGHAN JEAN SOSNOWSKI, SARAH FRANCES BROSNAN, and HEATHER M. KLEIDER-OFFUTT, Georgia State University (Sponsored by J. David Smith) - Determining facial dominance in unfamiliar individuals is a critical and adaptive social skill when deciding how and whether to approach an individual. Both humans and nonhuman primate species live in social hierarchical settings, so the ability to quickly perceive and categorize dominance in faces is socially advantageous in predicting another's behavior. In the current study, we assessed whether tufted capuchin monkeys (N = 24) have the ability to categorize 2-D images of faces of known conspecifics (i.e. of the same species) into dominance categories (e.g. dominant or non-dominant) based on their perceived facial structures. Most monkeys correctly categorized known conspecifics based on their facial dominance above the criterion of 80% correct responses (M = 14 sessions, SD =12.8). We then explored whether they were able to generalize via the categorization of new photos of the same individuals. Eventually, we will see if monkeys use these categories to make judgments about unknown conspecific faces. If they do, the results would provide support for the critical role of visual stimuli in primate social cognition.

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6:00-7:30 PM (5071)

Semantic Factors in the Processing of Negation in Sentence-Picture Correspondence Task. VLADIMIR SPIRIDONOV, RANEPA, NIKITA IVANOVICH LOGINOV, RANEPA & NRU Higher School of Economics, ELENA SELIVANOVA, RANEPA - Numerous studies show that negative statements are more difficult to understand than ordinary statements (Kaup et al., 2006). The processing of negations in classical sentence-picture correspondence task takes longer time and is accompanied by a larger number of errors. Also there's got recent evidence that in case of contradictory negation (the door is not closed/ open) the average reaction time differs in correct and incorrect samples, but in case of non-contradictory negation (the apple is not red/«any color») the average reaction time does not differ (Du et al., 2014). The present experiment was aimed at studying whether negative statements will be more difficult to process than positive ones in case of a simpler syntactic structure of the sentence, as well as how the number of errors and reaction time will change depending on the semantic proximity of the categories of objects used in sentences and images, as well as their frequency. As a result, it was found out that the semantic proximity and the frequency of the used categories influences

on the number of errors in sentence-picture correspondence task while processing negation. This kind of results let us highlight the specific role of semantic in negation processing. Email: Vladimir Spiridonov, vfspiridonov@yandex.ru

6:00-7:30 PM (5072)

Divergence of Individual and Gist Memory During Memory Consolidation. HAIYUN TIMA ZENG and SHARON L. THOMPSON-SCHILL, University of Pennsylvania (Sponsored by Sharon Thompson-Schill) - Memory encoding requires both individuation of specific episodes as well as extraction of gist, or schemas, about related experiences. This study developed a spatial memory paradigm to track changes in individual memory (memory for specific locations) and gist memory (center estimate of individual instances) across a period of 30 to 57 days, and to measure the relation between these two forms of memory. After 30 days, individual memories decayed and surprisingly, became more biased away from gist memory for all participants. On the other hand, gist accuracy significantly improved for participants who did not meet a gist memory criterion on the first day. We observed a significantly positive correlation between individual memory performance and gist memory performance on the second day, but not after 30 days. These findings indicate that individual memory and gist memory diverge during memory consolidation. Email: Haiyun Tima Zeng, hzen@sas.upenn.edu

6:00-7:30 PM (5073)

Semantic Memory Provides a Basis for Cultural Identity. CHRIS BLAIS, GENE BREWER, and ADAM COHEN, Arizona State University (Presented by Chris Blais) - Many psychological processes which were once thought to be universal and inherent aspects of being human vary in profound ways across cultures. The current work reports an analysis of the relation between semantic memory and cultural identity. We hypothesized that semantic memory output would vary in a systematic manner as a function of cultural identity because the experiences that individuals from various cultural groups are exposed to over the course of their lives should lead to differentiated semantic memory networks. To test this hypothesis, we gave 416 college students an animal fluency task, a letter fluency task, six cultural fluency tasks, and a cultural identity survey. We report similarities and differences in output dynamics during the standard and cultural fluency tasks (total number recalled, output order, clustering, inter-response times), a semantic network analysis of the cultural fluency tasks (similarity in participant output), and we show that these measures derived from the cultural fluency tasks covary with self-reported cultural identity. Taken together, the results from this study support the hypothesis that semantic knowledge provides a basis for cultural identity.

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6:00-7:30 PM (5074)

Does Multiculturalism Enhance Creativity? JOSEPHINE O'MALLEY, *The Graduate Center CUNY*, VIRGINIA VALIAN, *Hunter College* (Sponsored by Virginia Valian) – Exposure to different cultures can enhance creativity, though it is not clear what kind of exposure provides this benefit. We examine the effects of multicultural identification on a divergent thinking task in which participants list different uses for a brick and a tin can. Participants were 35 multilingual undergraduates who self-reported identifying with up to two cultures. Participants were scored on fluency (the number of responses given) and flexibility (the types or categories of responses given). *T*-tests revealed no differences in either measure for the brick or the tin can, nor did these measures correlate with strength of identification with participants' culture(s). Participants who reported identifying with American culture (*N*=16) were more flexible in their responses to the tin can (t(33) = -2.35, p < .05). Lack of identification with the culture one is living in may detract from divergent thinking.

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6:00-7:30 PM (5075)

Visual Ensemble Statistics Induce Distributed Attention and Increase Subsequent Insight Problem Solving. TIFFANI NG and MARK BEEMAN, Northwestern University (Sponsored by Marcia Grabowecky) - Previous studies from our group suggest that people solve more problems analytically after performing attention tasks that putatively demand more selective attention, and, more tentatively, people solve more problems by insight after performing attention tasks that seem to require less selective or more distributed attention. In this study, 37 participants reliably solved more Compound Remote Associate problems with insight after completing an ensemble statistics task in which they estimated the average size of a display of variously-sized circles (adapted from Chong & Treisman, 2005) than at baseline. In contrast, given the same displays but tasked with estimating the size of the central circle, 34 participants did not subsequently increase in insight nor analytic solving compared to baseline. The findings putatively suggest that performing an ensemble statistics task can induce a state of distributed attention that is conducive to subsequent insight solving.

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6:00-7:30 PM (5076)

Cognitive Profiles of Climate Change Beliefs: A Mental Models Perspective. MATTHEW ANDREOTTA and MARK HURLSTONE, University of Western Australia, FABIO BOSCHETTI, Commonwealth Scientific and Industrial Research Organisation, SIMON FARRELL, University of Western Australia, CECILE PARIS, Commonwealth Scientific and Industrial Research Organisation, IAIN WALKER, University of Canberra (Sponsored by John Dunn) - Mental model perspectives argue perceptions of climate change are underpinned by model-based reasoning-that is, people construct and manipulate simplified mental realities to make inferences about the climate. Misconceptions of the causes and consequences of climate change generate misleading inferences regarding the effectiveness of interventions. Although research has identified the content of laypeople's mental models of climate change, few studies test whether individual differences in mental models account for differences in broader climate perceptions, emotions, and policy preferences. We segmented

public citizens on the basis of their interpretation of climate change phenomena—using the Q methodology (Brown, 1980)—to develop a set of cognitive profiles. We identified the degree to which mental models and other variables (e.g., values, personality, cognitive style, and worldviews) predicted profile membership. This work provides insights for mental model theory and suggests ways climate change communicators might tailor messages for each cognitive profile to optimise communication effectiveness.

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6:00-7:30 PM (5077)

Level of Abstraction in Insight Problem Solving: Construal Level Changes the Representation of a Problem Differently. DUMI PYO, IK-HYUN MOON, JUNHEE KIM, and KYUNGIL KIM, Ajou University (Sponsored by Bridgid Finn) - Impasses of an insight problem can be solved by two ways of representational change: constraint relaxation or chunk decomposition. Level of abstraction might moderate the process. People processing at a higher level of abstraction (higher level of construal) may be less bound by representational constraints by considering 'why' rather than 'how', while people processing at a lower level(lower construal) are better at breaking up chunks since they focus more on detail. A modified version of typical categories vs. examples task was used to manipulate construal level of participants, and two matchstick insight problems were used to elicit constraint relaxation and chunk decomposition. Results shows that significantly more people in higher-level construal used constraint relaxation compared to lower-level participants who attempted chunk decomposition more. Level of abstraction did not change problem solving accuracy, but it appeared to change problem representation.

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6:00-7:30 PM (5078)

The Smart Intuitor: Cognitive Capacity Predicts Intuitive Rather Than Deliberate Thinking. MATTHIEU TAHINA SAMUEL RAOELISON, Université de Paris, LaPsyDÉ, CNRS, VALERIE A. THOMPSON, University of Saskatchewan, WIM DE NEYS, Université de Paris, LaPsyDÉ, CNRS (Sponsored by Wim De Neys) - People are often biased by their intuitions, as evidenced by research into heuristics and biases. The popular explanation is that sound reasoning requires us to override and correct those intuitions, which is demanding and therefore often fails. Thus, cognitive capacity is commonly assumed to predict performance in classical reasoning tasks because people higher in cognitive capacity are better at this deliberate correction process. However, recent findings suggest that people also have accurate, "logical" intuitions and that there can be a positive correlation between cognitive capacity and correct intuitive thinking. Two studies investigated whether cognitive capacity would be more predictive of having correct intuitions or successful deliberate correction of an incorrect intuition using a two-response paradigm with a direction-of-change analysis to check whether correct responses were generated intuitively or resulted from deliberate correction. Although cognitive capacity was associated with the correction tendency, it was more predictive of correct intuitive responding.

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6:00-7:30 PM (5079)

Effects of Analytical Thinking on Base Rate Neglect. HIDEYA KOSHINO, ROBERT RICCO, JASMINE BONSEL, and STEPHEN WARE, California State University, San Bernardino (Presented by Hideya Koshino) - Contemporary Dual Process models of reasoning claim that individuals with an analytical thinking (type 2) predisposition are better able to resist interference from belief-based (type 1) processing, but are more susceptible to interference from logical or statistical processing. This claim was tested by way of a Base Rate Neglect Task on which participants rated the likelihood that a randomly selected individual belonged to a group with a higher base rate (e.g., 900 plumbers compared with 100 chefs) or a group that corresponded to a stereotypic description of the individual (e.g., likes fancy food). Analytical thinking predisposition was measured with the AOT. Results indicated that when instructed to focus on the base-rate information, high analytical thinkers were better able than low analytical thinkers to ignore strongly stereotypic information. When instructed to focus on the stereotypic description of the individual, however, high analytical thinkers were less able to ignore extreme base-rate information.

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6:00-7:30 PM (5080)

The Symbolic Functions of Motor Programs in Insight Problem Solving. NATALIA LAZAREVA, ALEXANDRA CHISTOPOLSKAYA, and ANASTASIYA KUTUZOVA, P.G. Demidov Yaroslavl State University (Presented by Natalia Lazareva) - We are interested in studying of how the lowlevel motor programs influence on insight problem solving. Several studies have shown the possibility of motor facilitation in insight problem solving. The experimental data shows that the motor exercises embodying the solution of Mayer's problem with two strings facilitated the problem solution. We investigate the role of the motor programs in solving the symmetry problem. Material and methods. The participants have to solve the symmetry problem: find the rule by which 3 elements are composed and then propose 4th element based on the rule. Participants performed a motor task (embodied solution principal fully or partial) every 5 minutes. Results and Conclusions. There are significant differences between number of successful solvers in groups with a control and "embodied" type of motor task. Significant facilitating role of embodied motor activity in insight solution was found. The work was supported by grant № 075-015-2019-394 (MK-70.2019.6) Email: Alexandra Chistopolskaya, chistosasha@mail.ru

6:00-7:30 PM (5081)

Training for Wisdom: The Illeist Diary Method. ANNA DORFMAN, IGOR GROSSMANN, and HARRISON OAKES, *University of Waterloo*, KATHLEEN D. VOHS, *University*

of Minnesota, HENRI SANTOS, Geisinger Health System, ABIGAIL A. SCHOLER, University of Waterloo - We tested the utility of illeism - a practice of referring to oneself in the third person - for the trainability of wisdom-related characteristics in everyday life: i) wise reasoning (intellectual humility, openmindedness in ways a situation may unfold, perspective-taking, attempts to integrate different viewpoints) and ii) accuracy in forecasts about emotions toward close others. In a month-long field experiment, people adopted either the third-person training or first-person control perspective when describing their most significant daily experiences. Assessment of spontaneous wise reasoning before and after the intervention revealed substantial growth in the training (vs. control) condition. At the end of the intervention, people also forecasted their feelings toward a close other in challenging situations. A month later, these forecasted feelings were compared against people's experienced feelings. Participants in the training (vs. control) condition showed greater alignment of forecasts and experiences, largely due to changes in their emotional experiences. The present research demonstrates a path to evidence-based training of wisdom related cognitive and emotional processes via the practice of illeism.

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6:00-7:30 PM (5082)

Influences of Evidence and Emotion in Motivated Reasoning. GIOVANNI A. QUARTARARO and VALERIE A. THOMPSON, University of Saskatchewan (Sponsored by Valerie Thompson) - We contrasted predictions from Motivated Reasoning Theory (MRT) and Dual Process Theory (DPT) regarding the impact of emotions and belief on people's ability to assess argument strength. MRT posits that arguments involving emotional material are not appraised based on argument strength; rather information is recruited to justify previously held beliefs. In contrast, DPTs predict that while fast initial (Type 1) processes should be sensitive to beliefs, analytic (Type 2) processes should account for argument strength. In order to compare theories, participants (N=128) read conversation transcripts whose content varied on believability, evidence strength, and emotionally-relevant content. Participants gave a fast, initial answer followed by a slower, more reflective second answer. Consistent with DPT, while participants were sensitive to emotional content, they were still able to discern between strong and weak evidence, and the effect of belief diminished between the first and second answer.

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6:00-7:30 PM (5083)

Independent Testimonies Are No Better Than Sequential Testimonies in Judgments Under Uncertainty. BELINDA XIE, DANIELLE J. NAVARRO, and BRETT K. HAYES, *University of New South Wales* (Sponsored by Brett Hayes) – Suppose three friends tell you one thing, but then you observe evidence to the contrary. How much weight do you give the social evidence, relative to your private data? Does this depend on whether the three friends had listened to each other or not? We used the ballsand-urns task to explore these questions. Following Whalen et al., (2017), three to seven helpful informants were each shown one randomly-sampled ball from one of two randomly selected urns, before guessing which urn the ball was drawn from. We manipulated whether the informants provided the participant with *independent testimony* by guessing based solely on their own ball, or *sequential testimony* by also considering the guesses of previous informants. The participant then observed one randomly-sampled ball from the selected urn and judged which urn was most likely to be the source of the draws. Participant

judgments were sensitive to the amount of evidence provided by informants. However, across several experiments, we found no clear evidence that they discriminated between independent and sequential testimony. We discuss how participants' behaviour deviated from a Bayesian model of social learning (Whalen et al., 2017) and the implications of this result. Email: Belinda Xie, belinda.xie@unsw.edu.au

6:00-7:30 PM (5084)

Effective Strategies - When Do They Fail? DESTINY R. BELL and HEATHER R. BAILEY, Kansas State University (Sponsored by Heather R. Bailey) - There are a multitude of solutions to solve any given problem, and some are more effective than others. In the current study, we assessed the strategies--constructive matching (effective) and response elimination (less effective)-used on a fluid intelligence task, the Raven's Advanced Progressive Matrices (RAPM) and evaluated whether their efficacy depended on the perceived difficulty of the problem. Participants completed the RAPM task and reported the strategy used to solve each problem and how difficult the problem was. Replicating prior work, overall RAPM performance was higher when participants reported using constructive matching than response elimination. Further, RAPM performance decreased as perceived difficulty increased. Most importantly, strategy use interacted with perceived difficulty such that constructive matching was only effective when perceived difficulty was low. These results suggest that so-called effective strategies might not be useful under all circumstances, such as when the problem becomes too difficult.

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6:00-7:30 PM (5085)

The Relationship Between Vaccine Experience and Vaccine Harm Belief. WILLIAM LANGSTON, EMORY BIBB, and ALEXANDER KAH, Middle Tennessee State University (Presented by William Langston) - Freeman, Garety, Kuipers, Fowler, & Bebbington (2002) proposed that beliefs form in one stage of a two-stage process and are maintained in a separate stage. Langston, Fehrman, D'Archangel, Anderson, and Hubbard (2017) presented ghost belief data supporting the experiencebelief relationship predicted by Garety et al. The purpose of the present research was to extend the previous research to a novel belief. Participants were asked about experiences with vaccines and their vaccine beliefs. Group comparisons supported the existence of an experience-belief relationship, and there was a correlation between personal experience and vaccine harm belief. The specific aspects of experience that most strongly predicted harm belief and personality variables associated with

experience were also evaluated. In addition to providing support for the model, the data suggest who might be susceptible to belief in vaccine harm and how that belief might form. Email: William Langston, william.langston@mtsu.edu

6:00-7:30 PM (5086)

Riddle Me This: How Verbal Ability Defines the Relationship Creative Problem-Solving. Between Humor and CHRISTOPHER C. SIMMONS, University of Massachusetts Dartmouth, BROOKE E. MCKAY, University of Massachusetts Dartmouth, TRINA C. KERSHAW, University of Massachusetts Dartmouth (Presented by Trina Kershaw) - Research on the relationship between humor and creativity has suffered from a poor understanding of how components of humor are related. Methodological differences in the measurement of humor have resulted in contradictory findings. This study aims to produce a better model of the relationship between humor ability, humor style, creativity, and verbal intelligence. Participants completed humor production tasks, a humor styles questionnaire, verbal insight problems, the Remote Associates Test (RAT), the alternative uses test (AUT), the Creative Behavior Inventory (CBI), and a vocabulary test. Initial findings suggest that, consistent with prior literature, there is no relationship between humor styles and AUT fluency scores. Affiliative humor style, however, was correlated with both CBI and RAT scores. Vocabulary score and insight problem solving predicted RAT scores, along with an interaction between affiliative humor style and vocabulary. Vocabulary predicted RAT score only at mean and higher levels of affiliative humor style.

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6:00-7:30 PM (5087)

Judgments of Solvability are Insensitive to Water Jug Problem Difficulty. IAN R. NEWMAN and VALERIE A. THOMPSON, University of Saskatchewan (Sponsored by Valerie Thompson) -How do we determine whether we should give-up or persevere during problem solving? In some cases, the optimal choice is to discontinue the problem but in others, persistence will lead to success. During a water jug task, participants made judgments of problem solvability at frequent intervals. We manipulated both valid and misleading cues to problem difficulty and the option to give-up at any point on each problem was provided. Correct solutions to the problems were found infrequently but problem solvers tended to unsuccessfully persist for relatively long durations. Overall, judgments of solvability tended to decrease as time spent on the problems increased but were largely insensitive to both valid and misleading cues to actual problem difficulty. Notably, judgments of solvability prior to correct solutions were higher than prior to giving-up at each time interval, but only after participants had begun attempting to solve the problems.

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6:00-7:30 PM (5088)

Multimodal Corpus of Insight Solutions. ILYA YU VLADIMIROV and IGOR N. MAKAROV, *Demidov Yaroslavl State University* – Many models of insight problem solving composed of one-way sequential stages. The models explain short-term problems (CRA, anagrams) but for them it is difficult to trace the processes preceding the solution. Longterm problems give a phenomenology for which cyclical models are more adequate to explain (Fedor, 2015). Meanwhile, there is no systematic collection of phenomenology using which it would be possible to build cyclical models and ways for their verification. To solve this, a videocorpus of records of the insight problems solution with markup by ELAN program had been created. An analysis of the corpus showed that the recurring key stage of the solution is an impasse, the overcoming of which is accompanied by behavioral factors indicating the activation of the internal attention mode. Further analysis is aimed at identifying solution cycle patterns and the associated modes of cognitive processes operations. Supported by RSF 18-78-10103 Email: Ilya Yu Vladimirov, kein17@mail.ru

6:00-7:30 PM (5089)

Fixedness in Anagram Solving: Semantic, Phonological, or Both? OLGA S. PETSEVA, Demidov Yaroslavl State University, DMITRII D. KOZLOV, Samara University, ELENA S. GORBUNOVA, NRU Higher School of Economics, ANASTASIYA V. SMIRNITSKAYA, Demidov Yaroslavl State University - Fixedness in anagram solving can make the task harder to solve. Such fixedness may be semantic or phonological. The goal of the present study is to find out what kind of fixedness makes a greater impact on anagram solving. For the purpose of our study, three types of five and six letter anagrams were created: 1) letters inside anagram make another shorter word (that implies both semantic and phonological fixedness); 2) letters inside anagrams make pseudoword (wellpronounced meaningless chunks, phonological fixedness only); 3) usual anagrams (no any fixedness). 45 participants tried to solve 15 anagrams of each type. The presence of semantic fixedness decreased the number of anagrams been solved and increased the time of task solving for five letter anagrams only. Hence, there were no evidence of semantic fixedness influence in solving six letter anagrams. There were no any effect of phonological fixedness for both five and six letters anagrams. We argue that these results provide limited support for semantic fixedness and question phonological fixedness in anagram solving. Supported by Russian Foundation for Basic Research (grant 17-06-00672).

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6:00-7:30 PM (5090)

The Effects of Cognitive Demand and Emotional Status on the Incubation Effect in Group Creativity Tasks. QICHEN ZHAO and BEVERLY ROSKOS, *The University of Alabama*, ANTHONY FANT, *The University of Alabama* (Sponsored by Beverly Roskos) – In research of creativity, the incubation effect describes how creativity can be increased by taking a break. Previous research mainly focuses on participants working individually. In our current study, a group (dyad) context is employed. Six experiments are designed combining three different divergent thinking tasks and two dimensions of incubation activities. The three divergent thinking tasks include Alternative Uses task, Instances task and Consequences task. The two incubation activity dimensions are the cognitive demand (high vs. low) and the emotional status (positive, negative & neutral). The creativity performance is measured by fluency, originality and uniqueness. Results of the first experiment (Alternative Uses & cognitive demand) confirmed the incubation effect in a group context as creativity performance significantly increased in all incubation conditions compared to the continuous working (no-incubation) condition. There was a larger incubation effect for high and low cognitive-demand conditions compared to rest or continuous working conditions. The results also show possible different effects for high and low cognitive-demand tasks. The results give us the evidence that taking breaks benefits group creativity.

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6:00-7:30 PM (5091)

Meta-Reasoning, Calibration, and Accuracy: Feelings of Error Versus Feelings of Rightness. DANIEL G.W.J. GEARY and VALERIE A. THOMPSON, University of Saskatchewan (Sponsored by Valerie Thompson) - Meta-Reasoning constitutes the processes that monitor and control reasoning and problemsolving actions. The framework proposed by Ackerman and Thompson (2017) suggests that one's monitoring judgments are mediated by cues that are not always well calibrated with accuracy. This claim is now challenged by new studies examining the feeling of error (FOE) which have demonstrated that FOE is well calibrated, and this incongruence of findings may be largely driven by a framing effect arising from the positive and negative valency in how the metacognitive question is asked (Cruz, Arango-Muñoz, & Volz, 2016). Our goal was to test this claim by comparing the positively-framed (feelings of rightness or FOR) and negatively-framed (FOE) metacognitive assessments in reasoning. In separate experiments, reasoners completed one of three tasks: conditional reasoning (N = 60), a denominator neglect task (N = 60), and a mathematical reasoning task (the number bisection task) (N = 60). Participants made a FOR or FOE judgment after each problem (between-subjects). Results from these data provide support for the Meta-Reasoning framework's assumption that metacognitive feelings are cuebased any may therefore not be reliable indicators of accuracy. Email: Daniel G.W.J. Geary, daniel.geary@usask.ca

6:00-7:30 PM (5092)

Great Expectations: Misleading Effects of Images in the Alternate Uses Task. TIM GEORGE, Union College, MARTA K. MIELICKI, Kent State University, JENNIFER WILEY, University of Illinois at Chicago - When prompted to think creatively, what expectations do people have about their performance? Prior work indicates that images can skew predictions in several contexts. The present experiments tested whether the presence of object photographs in the alternate uses task (AUT) would inflate predictions of creativity. Participants predicted how likely they were to generate a creative use for a series of objects, some of which were accompanied by photographs. Participants provided higher creativity predictions for objects in the image than no-image condition (Experiment 1). When prompted to actually generate uses for the objects, measures of creativity were lower in the image condition than no-image condition (Experiment 2). Participants also retrospectively rated their average creativity higher in the image than no-image condition. These results fit with prior research showing that images can harm creative performance, while providing a novel extension of metacognitive work showing that images can inflate predictive judgments.

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6:00-7:30 PM (5093)

Effects of Verbalization on Insight Problem Solving: Does the Addressee Matter? SACHIKO KIYOKAWA, Nagoya University, ZOLTÁN DIENES, University of Sussex - The purpose of the present study was to investigate the effects of addressee of verbalization, self or other, on insight problem solving. Fortyone participants were assigned to one of the three conditions: toward-self verbalization, toward-other verbalization, or irrelevant verbalization (control). A 3-minute verbalization phase was inserted after 5 minutes of solving the T-puzzle. The participants were asked to write down how they tried to solve the problem in the first 5 minutes as a record like a diary in the toward-self verbalization condition, and as an instruction for other participants in the toward-other verbalization condition. The participants in the control condition were required to write down their interests that have nothing to do with the puzzle. After that, they were asked to engage in the puzzle again for 10 minutes. The results showed a detrimental verbalization effect on insight problem solving irrespective of the addressee.

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6:00-7:30 PM (5094)

Learning to Solve Insight Problems: Heuristics Transfer in a Set of Insight Problems. SERGEI KOROVKIN, VANIK OGANESYAN, ANNA D. SAVINOVA, EKATERINA N. MOROZOVA, and ALEXANDRA R. LUNEVA, Yaroslavl State University - Previous studies reveal significant difficulties and limitations of problem solving through analogy transfer from one insight problem to another. Despite those limitations, we assume that insight problem solving is amenable to learning due to acquisition of specific heuristics. To confirm this hypothesis we conducted a longitudinal study in which subjects were trained to solve short insight problems. As experimental tasks, we used domain-general creative problems that require common knowledge. Domain-specific tasks requiring special knowledge were used as control tasks. Throughout 15 weeks, we examined 10 participants. At this period, they solved 560 problems in total, half of which was domain-general and the other half domain-specific. Comparing the effectiveness of problem solving at the beginning and at the end of training, we found transfer effect in domain-general creative tasks. In our opinion, it is due to using of heuristics and strategies in creative problem solving. Supported by RSF grant 18-78-10103. Email: Sergei Korovkin, korovkin_su@list.ru

6:00-7:30 PM (5095)

TargetedProblemReactivationDuringSleepImpactsMemory for the Problem Solution One Week Later.KRISTINGRUNEWALD,KIRARILEY,SOPHIAMCCULLOUGH,KENA.PALLER,andMARKBEEMAN,Northwestern

University (Sponsored by Mark Beeman) - Prior research shows that memories are reactivated during sleep, leading to better consolidation of learned material, and that reactivation can be manipulated by presenting associated cues during sleep. We recently showed that cueing previously unsolved puzzles during sleep led participants to solve cued puzzles better than uncued ones the following morning. This study examined the relation between cueing, solving, and week-later memory. In evening sessions, participants attempted to solve puzzles paired with distinct sound cues. Later, half the sound cues were presented while participants slept. In the morning, participants reattempted their unsolved puzzles and, if still unsolved, were told the solutions. Participants solved more cued than uncued puzzles. About a week later, participants completed a surprise memory test in which they recalled puzzle details and solutions. As in previous research, participants remembered puzzle solutions better if they had solved the puzzle themselves than if they were told the solution. Additionally, participants recalled solutions better if the puzzle (not solution) had been cued overnight, suggesting that cueing prepared the puzzle representation for later integration with the solution.

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6:00-7:30 PM (5096)

A Mechanistic Account of the Relation Between Working Memory Capacity and Fluid Intelligence. KIMBERLY M. WINGERT, University of Southern California, THOMAS S. REDICK, Purdue University, GENE BREWER, Arizona State University - Working memory capacity and fluid intelligence are important predictors of performance in educational settings. Thus, understanding the processes underlying the relation between working memory capacity and fluid intelligence is important. Three large scale individual differences experiments were conducted to determine the mechanisms underlying the relation between working memory capacity and fluid intelligence. Experiments 1 and 2 were designed to assess whether individual differences in strategic behavior contribute to the variance shared between working memory capacity and fluid intelligence. In Experiment 3, competing theories for describing the underlying processes (cognitive vs. strategy) were evaluated in a comprehensive examination of potential underlying mechanisms. These data help inform existing theories about the mechanisms underlying the relation between working memory capacity and fluid intelligence. However, these data also indicate that the current theoretical model of the shared variance between working memory capacity and fluid intelligence would need to be revised to account for the data in Experiment 3. The theoretical implications of observing those relations in the Experiment 3 data are considered. Email: Kimberly M. Wingert, kwingert@usc.edu

6:00-7:30 PM (5097)

A New Look at Novelty, Repetition, and WMC in gF Tasks. MEGAN J. RADEN and ANDREW F. JAROSZ, *Mississippi State University* (Sponsored by Michael Pratte) – Prior work examining the role of rule-combinations in the working memory capacity (WMC) and fluid reasoning (gF) relationship has been mixed, sometimes showing WMC best predicting performance on problems requiring novel rule-combinations while other times best predicting repeated-rule performance. The present experiment used a figural analogies task to resolve this discrepancy, presenting each unique rule combination three times: a first (novel) iteration; a second iteration, either immediately following the first or after a short (two trial) delay; and a third iteration at least ten trials after the second. In a hierarchical regression predicting WMC, novel items significantly predicted WMC while immediately-repeated items did not. Replacing immediately-repeated items with shortly-delayed items resulted in both novel and repeated items predicting WMC. However, adding third-iteration problem performance to the model subsumed all other variance, solely predicting WMC. Results are discussed in terms of current theories of WMC and its role in gF performance.

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6:00-7:30 PM (5098)

The Effects of Acute Pain on Problem Solving. DEREK M. ELLIS and GENE A. BREWER, Arizona State University (Sponsored by Gene Brewer) - Individuals solve a variety of problems every day. Two tasks commonly used to measure problem solving are algebra and compound remote associates (CRAT). These two tasks differ in participants' subjective reports of solution recovery based on their perceived use of analytical versus insight processes. Accordingly, attention control is differentially related to problem solving in these two tasks based on the need to maintain information in algebra problems and inhibit incorrect solutions in CRAT problems. Pain hinders attention control and should affect problem solving accuracy and subjective reports of solution recovery differentially in these two tasks. Participants attempted the two types of problems in pain or not in pain. Acute pain was manipulated by having participants place their index finger into a pressure algometer and increase pressure until they reached a subjective pain threshold. CRAT performance significantly decreased while in pain, but algebra performance did not differ while in pain. As expected, analytical processes were more often report for algebra problems and insight processes were more often reported for CRAT problems. Acute pain did not affect the distribution of analytical and insight processes reported. Email: Derek M. Ellis, dmellis2@asu.edu

6:00-7:30 PM (5099)

Do Shark Lawyers Literally Exist? The Metaphor Interference Effect in Conceptual Combination. HAMAD AL-AZARY, CHRISTINA L. GAGNÉ, and THOMAS L. SPALDING, *University of Alberta* – People take longer to determine metaphoric sentences (e.g., some lawyers are sharks; some jobs are jails) are literally-false than anomalous sentences (e.g., some jobs are sharks; some lawyers are jails). This metaphor interference effect (MIE) shows that metaphoric meaning is automatically computed. To date, the MIE has only been observed in sentence stimuli in which the metaphoric composition is explicitly stated. In this experiment we used combined concepts (e.g., shark lawyer), which are more ambiguous in their metaphoric composition than A is B metaphors, and asked participants to determine if they refer to something that literally exists. We found a MIE in which metaphoric combinations (e.g., shark lawyer; silky sunset) took longer to judge as literally-false than anomalous combinations (e.g., shark sunset; silky lawyer). Thus, the automatic computation of metaphorical meaning is not triggered by, or limited to the traditional sentence format. Email: Hamad Al-Azary, alazary@ualberta.ca

6:00-7:30 PM (5100)

Backward Priming in the Go/No-Go LDT: Evidence for an Automatic Semantic Matching Process. RYAN D. CALCATERRA, Montana State University (Sponsored by Michelle Meade) - Backward (BA) priming is the facilitated recognition of a target item (e.g., stork) following a related prime (e.g., baby) in which there is little-to-no prime-totarget association, but a strong target-to-prime association. BA priming is often explained by a strategic semantic matching process that is engaged only when it assists a binary response in the lexical decision task (Neely, Keefe, & Ross, 1989). However, BA priming may rely on an automatic semantic matching process, as BA priming occurs under conditions that reduce the utility of a semantic matching strategy (Calcaterra, in preparation). In the present study, BA priming was found in the go/no-go LDT, a task previously argued to reduce use of a semantic matching strategy, suggesting that BA priming indeed relies on an automatic process.

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6:00-7:30 PM (5101)

Female Farmers and Male Nurses: An Exploration of the Role of Metacognitive Monitoring on Attribute Ratings of Schema Congruent Stimuli. EMALIE S. HENDEL and JOËL DICKINSON, Laurentian University, ANNIE ROY-CHARLAND, Université de Moncton - The ease with which we process information can influence our judgements of it. Additionally, information which matches our mental representations of a concept is processed more quickly than mismatched information. In this study, participants were exposed to an article which was gendered or neutral in theme. Directed forgetting was employed to enhance the priming effect of the articles. Eye-tracking measures were used to examine the reading speeds of further semantically congruent or incongruent information pertaining to gender-occupation schemas. Upon the first pass through a text, participants who had received the gendered prime read incongruent pronouns more slowly than congruent pronouns. Additionally, participants read incongruent male pronouns more slowly than incongruent female or congruent male pronouns. Overall, texts with male characters or with incongruent pronouns were read more slowly than their counterparts. Moreover, participants who had received the gendered prime rated incongruent females as being less likeable than congruent females or incongruent males. However, those who had received the neutral prime rated male characters as being less likeable than females. Email: Joël Dickinson, jdickinson@laurentian.ca

6:00-7:30 PM (5102)

Semantic Density Effects May Be Cumulative Interference During Picture Naming in Unstructured Lists. ROBERT T. ASHWILL and DANIEL H. SPIELER, Georgia Institute of Technology (Sponsored by Daniel Spieler) - Producing words involves mapping semantic properties to lexical representations. When multiple lexical representations are activated, selection takes longer, consistent with a competitive process. A many to many mapping of semantic features to words should result in frequent partial activation of competing representations. Consistent with this, words from dense semantic neighborhoods should be slower to select relative to words from sparser neighborhoods (Rabovsky, Schad, & Abdel Rahman, 2016). However, words from dense neighborhoods also have more within list neighbors creating a situation akin to cumulative semantic interference. We report results of three experiments showing no semantic neighborhood effect in picture naming without an initial familiarization phase but an effect after familiarization. We argue these data and previous observations can be explained through list context effects. Email: Robert T. Ashwill, r.t.ashwill@gatech.edu

6:00-7:30 PM (5103)

Priming Overt Production: The Role of Relationship Type and Selection Demands. SARA B.W. TROUTMAN and CHALEECE W. SANDBERG, Pennsylvania State University, MICHELE T. DIAZ, Pennsylvania State University - A key debate in the cognitive literature is which factors prime overt production. To date, several factors have been identified including lexical characteristics (i.e., length, frequency) of both the prime and target as well as the type of relationship between target and prime (i.e., associative, featural). This study presents two between-subject experiments which use mixed effects multilevel modelling to explore the effect of prime-target relationship on picture naming, while controlling for lexical characteristics of the targets and primes. Results revealed that associatively (β = -54.21 ms, p < 0.001) but not semantically (feature-based) (β = -13.83 ms, p = 0.45) related words led to faster word naming and that the effect of associative priming was larger when lexical selection demands were high ($\beta = -27.42$, p < .001). A third experiment replicated these effects within subjects and provides convergent evidence that production is primed by associative but not feature-based words.

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6:00-7:30 PM (5104)

What Makes a Metaphor Good? Using Word2Vec to Compute Metaphor Quality. PARASTOO HARATI and CHRIS F. WESTBURY, *University of Alberta* (Sponsored by Chris Westbury) – Kintsch & Bowles (2002) proposed a computational method that used Latent Semantic Analysis to compute the quality of an 'is-a' metaphor (e.g. 'Imagination is a tornado'; 'Fascination is a lantern'). They tested their model on 13 metaphors that had been rated as bad (<= 2/5 on a rating scale) and 13 metaphors that had been rated as good (>= 3/5). We have collected goodness (and other) ratings for 620 novel (computer-generated but hand-curated) metaphors using the best/worst method. We extended Kintsch & Bowles method \bigcirc

using word2vec vectors, on 95 good metaphors (best/worst goodness rating >= 1z) and 91 bad metaphors (best/worst goodness rating <= -1z). The computed goodness estimate was significantly better for the metaphors rated good by humans than those rated bad by humans (t(157) = 2.94, p = 0.004). The computed goodness estimates were more strongly correlated with human best/worst ratings of metaphor literality (r = 0.43) than with human ratings of metaphor goodness (r = 0.22; z =2.26, p = 0.02), suggesting that the measure proposed by Kintsch & Bowles is picking up mainly on that one aspect of metaphor quality.

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6:00-7:30 PM (5105)

Why Is Cosine Similarity A Bad Psychological Similarity Measure? Evidence from Clustering of Conceptual Property Norms Data. SERGIO E. CHAIGNEAU and ENRIQUE CANESSA, Universidad Adolfo Ibáñez - Often, researchers studying linguistically coded concepts use conceptual similarity measures obtained from property-based conceptual descriptions to uncover the underlying similarity structure of a set of concepts. Two similarity measures currently in use are cosine and correlation similarities computed from propertyfrequency data. However, we know little about these measures' behavior in comparison to other potential similarity measures. To provide a comparison, we computed cosine and correlation similarities based on different types of data for a large set of concepts and their associated properties and submitted them to clustering algorithms. Across different algorithms, cosine and correlation similarity computed from a simple set-theoretic measure (the number of shared properties among concepts) performed better than cosine and correlation similarities based on the original frequency-data. We discuss how the high dimensionality of frequency-data may explain its poor performance, and argue that this is bound to produce poor statistical performance in other statistical analyses alike. We suggest that researchers reconsider using cosine and correlation similarity measures computed from property-frequency data. Email: Sergio E. Chaigneau, sergio.chaigneau@uai.cl

6:00-7:30 PM (5106)

Evaluating Association Networks and Distributional Semantic Models in a Cooperative Word Game. ABHILASHA A. KUMAR, Washington University in St Louis, DAVID A. BALOTA, Washington University in St. Louis, MARK STEYVERS, University of California, Irvine - The predictive power of five semantic models of word representation (3 association networks, LSA and word2vec) was examined in a cooperative relational word game. Across two experiments, participant dyads were presented with 20-item word boards with word pairs of varying relatedness. Player 1 received a word pair from the board (e.g., CIRCLE-DANCE) and generated a one-word semantic clue (e.g., CELEBRATION). Player 2 attempted to identify the word pair and received at most three clues. Response times to generate the first clue and accuracy for the guessed word pair were strongly predicted by number of steps in the association networks, compared to cosines from LSA and word2vec. Accuracy for the second and third attempts

was higher if the second (e.g., SHAPE) and third clues (e.g., TANGO) were farther from the first clue (e.g., CELEBRATION), but closely associated to one of the words. Item analyses revealed that participants generated clues that were better captured by association networks (e.g., superordinate/higher-level categories), and less likely to be predicted by LSA and *word2vec*, indicating differences between distributional models of word representation and how individuals identify conceptual relationships among words.

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6:00-7:30 PM (5107)

The Fate of the Unexpected: Downstream Repetition Effects for Prediction Violations. MELINH K. LAI, University of Illinois at Urbana-Champaign, KARA D. FEDERMEIER, University of Illinois at Urbana-Champaign (Sponsored by Kara Federmeier) - This study investigated the potential downstream consequences of encountering prediction-violating words. EEG was recorded as participants read unexpected but plausible words in strongly and weakly constraining sentences. Three sentences later, the critical word was repeated at the end of a weakly constraining sentence. A second experiment used the same items with a higher proportion of strongly expected fillers. Both more implicit (N400) and explicit (LPC) indices of repetition were similar for prediction violations as for unpredictable repeated words. Additionally, behavioral memory results showed overall benefits of repetition but no effects of prior predictability. These findings suggest that while prediction violations are not difficult to encode, neither do they provide downstream memory benefits. Thus, prediction violations may be neither as costly - nor as critical - for comprehension as sometimes assumed.

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6:00-7:30 PM (5108)

The P600 ERP Reflects Cognitive Control's Influence on Real-Time Sentence Comprehension. ZOE OVANS and JARED NOVICK, University of Maryland, ALBERT KIM, University of Colorado, Boulder - During language comprehension, people often encounter conflicting cues that can create misinterpretations and the need to revise. We measured event-related potentials (ERPs) to test the hypothesis that cognitive-control mechanisms bias processing in real-time to resolve such conflicts. Participants read sentences like "The bathroom floor was mopping yesterday", where conflict arises between a syntactically-licensed interpretation (floor is Agent of mop) and a semantically plausible one (floor is Theme of mop). Participants also completed interleaved Congruent and Incongruent Stroop trials, which manipulated cognitive control immediately prior to sentence-reading trials. Target sentences elicited a P600 effect, replicating previous results that suggest readers typically adjust processing via syntactic revision to yield the plausible interpretation (e.g., mopping --> mopped). Crucially, the P600 was larger following Incongruent vs. Congruent Stroop, consistent with increased reanalysis attempts

when control is relatively upregulated. Moreover, individuals with small Stroop effects—suggesting superior control—had larger P600s, indicating increased re-processing attempts. Email: Albert Kim, albert.kim@colorado.edu

6:00-7:30 PM (5109)

Eye Movements in Reading Sentences with Transposed Words. KUAN-JUNG HUANG, University of Massachusetts, Amherst, ADRIAN STAUB, University of Massachusetts, Amherst (Sponsored by Adrian Staub) - Mirault et al. (2018) found that sentences with two transposed words (e.g., the white is cat big) elicited many incorrect 'grammatical' responses in a speeded judgment task. We tested similar stimuli while tracking readers' eye movements, also manipulating the length and syntactic category of the transposed words. The error rate was substantially lower than in Mirault et al., which we attribute to the fact that subjects read the sentences normally, i.e., from left to right, rather than after central fixation. Readers made fewer errors when the transposed words were sequentially fixated, compared to when either word was skipped, suggesting that word order is most likely to be encoded accurately when two words are encoded in sequential, temporally separated fixations. The most errors were elicited when both words were short. The results argue for only limited noise in readers' representations of word position.

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6:00-7:30 PM (5110)

Resumption and Individual Differences in Acceptability Judgments and Working Memory. ARIEL N. JAMES, Macalester College, DUSTIN A. CHACÓN, University of Minnesota, Twin Cities (Presented by Ariel James) - Resumptive pronouns (RPs) appear to resolve a filler-gap dependency (FGD) in place of a gap. While they are generally judged to be ungrammatical in English (Alexopoulou & Keller, 2007), they are judged to be more acceptable as overall sentence complexity increases (Chacón, 2018). One explanation is that the working memory burden of complex sentences leaves readers less sensitive to the unresolved FGD. This explanation suggests that lower working memory capacity (WMC) will predict higher acceptability of RP sentences. In the current study, N participants completed a reading span task to measure WMC and an acceptability judgment task. The sentences in this task were either unresolved FGD sentences (50% containing an RP; see 1) or complexity-matched control sentences (50% grammatical). Results suggest that lower WMC predicts higher acceptability across conditions; there was no interaction with resumption. (1) This is the butler that the maid said that his_{pp} her_{Non-RP} friend doesn't like kids.

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6:00-7:30 PM (5111)

The Influence of Sentence Context on Lexically Guided Perceptual Learning. SAHIL LUTHRA, RACHAEL STEINER, JAMES S. MAGNUSON, and EMILY B. MYERS, *University of Connecticut* (Sponsored by Emily Myers) – Individual talkers vary in how they produce speech sounds, so listeners must learn the appropriate mapping between acoustics and intended phonetic categories. Several studies have shown that listeners can leverage lexical knowledge to guide this perceptual learning process. Here, we examine how sentence-level semantic information – specifically, whether preceding sentence context is predictive of a word containing an ambiguous speech sound – can influence how lexical knowledge drives perceptual learning. Across a series of experiments, we manipulated whether participants received neutral or predictive sentence contexts and assessed their learning. Though we observed greater learning for subjects who read predictive contexts than for subjects who read neutral contexts, this finding did not replicate in a separate sample. Overall, our results suggest that potential influences of sentence context on phonetic recalibration may be small, particularly when lexical knowledge may be sufficient to resolve the identity of ambiguous speech sounds.

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6:00-7:30 PM (5112)

Acoustic Similarity Overrides Phonological Distinctiveness in Short-Term Memory Storage. ANGELA M. AUBUCHON, Boys Town National Research Hospital, ELIZABETH L. MONZINGO, The Ohio State University, ADAM BOSEN, Boys Town National Research Hospital - Declines in serial recall due to phonological similarity are attributed to difficulty maintaining mental representations during short-term memory storage, rather than to signal similarity during encoding. Specifically, the overlapping phonetic features of short-term memory traces become confused or overwritten during rehearsal or nonattentive storage. In this preregistered experiment (osf. io/cds9t), participants heard classic lists of phonologically overlapping and phonologically distinct words for immediate serial recall, except that the words had been degraded with a 4-channel vocoder. We capitalized on the degraded nature of vocoded speech to train one set of participants on the true identity of the phonologically overlapping tokens (e.g. pat, pan, man) while a second set of participants was trained to match the same acoustic signal to more distinct phonological tokens (e.g. pot, pain, noun). Training on distinct phonological tokens did not reduce the phonological similarity effect. Thus, the confusability of acoustic signals during encoding carries through to serial recall of a list, even when auditory signals can be discriminated individually.

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6:00-7:30 PM (5113)

Autistic Trait Burden and False Hearing: Evidence for Weak Central Coherence. ERIC J. FAILES, ZOE W. HAWKS, MITCHELL S. SOMMERS, and DESIREE A. WHITE, *Washington University in St. Louis* (Sponsored by Mitchell Sommers) – The Weak Central Coherence theory (WCCT; Frith, 1989) proposes that a central feature of language deficits in autism spectrum disorder (ASD) is reduced global (relative to local) processing, impairing ability to use contextual cues in speech. Recent research, however, suggests that language deficits in ASD may be specific to processing emotional language. We tested the hypothesis that autistic trait burden (ATB) – measured using the Social Responsiveness Scale – is associated with impaired processing of emotional, but not unemotional, ng (C)

semantic contexts. Participants identified words in noise at the end of five sentence types: neutral (The word is *box*), validunemotional (She put the toys in the *box*), invalid-unemotional (She put the toys in the *fox*), valid-emotional (The reckless driver made me *mad*), and invalid-emotional (The reckless driver made me *pad*). We found that ATB was negatively associated with susceptibility to false hearing (i.e., erroneously hearing the contextually predicted word in the incongruent conditions), suggesting that greater ATB was associated with reduced context use. ATB was equally predictive of false hearing in unemotional and emotional sentences, supporting the WCCT. Email: Eric J. Failes, e.failes@wustl.edu

6:00-7:30 PM (5114)

Development of Phonology Is Grammatical, Not Distributional. ELI F.W. BOWEN, ANNEMARIE BROWN, EVA CHILDERS, and RICHARD GRANGER, Dartmouth -Human infants remarkably acquire the speech sounds of their language via mere exposure. Separate research communities propose opposing hypotheses: either learning statistical distributions of individual speech sounds suffices, or learning requires speech sounds in the context of syllables and words. The former could be achieved via standard unsupervised categorization (clustering), whereas the latter entails lessstudied methods entailing relations, such as grammar learning, time series (e.g. RNNs), or relational embedding. We show that isolated phoneme learning depends critically on the characteristics of the data to be learned. Clustering methods can succeed on carefully curated data, but fail on natural data such as streaming speech. By contrast, natural data provides phonotactic and other contextual cues beyond spectrotemporal features: information that can be exploited to significantly improve acquisition in proposed learning models. We presented natural speech streams to a learning model and to human subjects; both were significantly inferior at identifying a vowel sound in the absence of naturally-occurring adjacent speech sounds. The model provides candidate explanatory mechanisms for these findings.

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6:00-7:30 PM (5115)

Dynamic Pitch Discrimination in Speech & Nonspeech. DANIEL R. TURNER, ANN R. BRADLOW, and JENNIFER S. COLE, Northwestern University (Sponsored by Allard Jongman) - Pitch perception in speech has traditionally been explored using stimuli that do not resemble spoken language. To test how prior findings generalize to speech, we compared pitch perception between resynthesized speech and two types of nonspeech: pulse-trains (spectrally simple) and scrambled speech (spectrally complex). In speeded tasks, native English and native Mandarin listeners judged pitch excursions of 5-50 Hz as rising, falling, or flat, over stimuli that varied in signal type, duration, and pitch range. Response accuracy and latency were analyzed. We found that perceiving pitch excursions in speech is significantly more difficult than in pulse-trains, and native Mandarin listeners are more sensitive to pitch change overall. When comparing pulse-trains to scrambled speech, we found that signal spectral complexity does not fully account for differences in accuracy between speech and nonspeech. Together, our findings indicate that signal type, signal complexity, and experience-dependent linguistic knowledge influence dynamic pitch discrimination in speech.

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6:00-7:30 PM (5116)

Rhythmic Priming for Metrical Speech in Turkish: Amplitude/Pitch And/Or Duration? ZUHEYRA TOKAC, Boğaziçi University, ESRA MUNGAN, Boğaziçi University, SUMRU OZSOY, Boğaziçi University - Studying large numbers of languages from native speaker perspectives is an integral part of understanding rhythm in language. Previous findings suggest that rhythmic primes facilitate phoneme detection latency in French nonwords (Cason & Schön, 2012). We replicated this study in Turkish and found that temporal and metrical priming lowered phoneme detection latencies in tri- but not bisyllabic nonwords. While previous studies focused on pitch- and amplitude-based stress as primes for language, we believe that duration-based stress is as important in priming. In an earlier study, when using duration-based rhythmic primes mimicking durations of subsequent open and closed syllables, we found a priming effect, yet an overall tri- over bisyllabic stimulus advantage obscured further interpretation. In a third study, we will employ an anapest prime since the long-longshort prime in the preceding experiment might have been too difficult for listeners to pick up. This way we plan to see whether simple binary/ternary rhythmic grouping or specific stress structure better predicts priming effects. Results will be discussed with respect to the rhythm-class hypothesis of languages.

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6:00-7:30 PM (5117)

Learning Different Forms of Degraded Speech as a Cognitive Skill. STEPHEN C. VAN HEDGER, University of Western Ontario, SHANNON L. HEALD, University of Chicago, HOWARD C. NUSBAUM, University of Chicago, LAURA J. BATTERINK, University of Western Ontario, MATT DAVIS, University of Cambridge, INGRID S. JOHNSRUDE, University of Western Ontario - Listeners can quickly adapt to several forms of degraded or otherwise challenging speech. This rapid learning may occur through reorienting attention to the most diagnostic features for recognition - a process that should be independent of the specific degradation and should rely on higher-order cognitive processes. Here, we tested these assumptions by assessing whether learning diverse forms of degraded speech was a general skill related to cognitive processing. Participants transcribed blocks of spoken sentences, manipulated in five ways meant to challenge recognition (noise-vocoded, sinewave, time-compressed, accented, and speech-in-babble). Participants also completed a fluid intelligence assessment. While we observed robust evidence of learning across all speech manipulations, only noise-vocoded and accented speech had significantly correlated learning slopes, with fluid intelligence significantly relating to learning slopes for only these measures.

Overall, these results suggest that adapting to certain speech challenges may be thought of as an auditory skill, subserved by higher-order cognitive mechanisms.

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6:00-7:30 PM (5118)

Early Stages of Speech Processing: A Combined Cognitive Neuropsychology and Electrophysiological Approach. COLIN NOE and SIMON FISCHER-BAUM, Rice University (Sponsored by Simon Fischer-Baum) - In order to be understood, speech sounds undergo a rapid series of transformations mapping from acoustic representations to stored representations of familiar words and their meaning. The goal of this project is to better understand these cognitive operations and their neural signatures. Combining electrophysiology with a single-case investigation of a patient with damage to phoneme level representations following stroke provides a window into the time course of these acoustic and the phonemic-level processes. Different ERP components appear to respond to aspects of sound that map to acoustic and phonemic levels, with the N100 indexing continuous acoustic cues such as voice-onset-time and the P200 indexing goodness of fit to feature categories, like voiced and unvoiced. However, the patient showed normal ERP responses until around 200 msec, suggesting the cognitive processes indexed by the N100 and P200 are precursors to phonemic level processing rather than indexing phonemic representations themselves. Email: Colin Noe, cmn2@rice.edu

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6:00-7:30 PM (5119)

About Face: Seeing the Talker Improves Spoken Word Recognition but Increases Cognitive Effort. JULIA F. STRAND, Carleton College, VIOLET BROWN, Washington University in St. Louis - Seeing a talker robustly improves listeners' ability to recognize speech in background noise, but the literature is mixed about whether and how seeing the talker affects the cognitive effort necessary to process speech. We demonstrate that even when the visual modality substantially improves recognition, processing audiovisual speech can still be more resource-intensive than listening alone. A dual-task paradigm showed that the costs associated with audiovisual speech processing were more pronounced in easy listening conditions, in which speech can be recognized at high rates through listening alone-indeed, effort did not differ between audiovisual and audio-only conditions when the background noise necessitated the use of the visual modality to improve speech recognition. We also show that though these effects replicate with different stimuli and participants, they do not emerge when effort is assessed with a recall paradigm rather than a dual-task paradigm. Together, these results suggest that the widely cited audiovisual recognition benefit comes at a cost and add to the growing body of research suggesting that various measures of effort may not be tapping into the same underlying construct.

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Visual Speech Can Override Effects of Speech Rate. HANNAH SHATZER, LAUREN GARNER, and MARK A. PITT, The Ohio State University (Sponsored by Richard Jagacinski) - Dilley & Pitt (2010) found that listeners' reports of function words in a short phrase (e.g., "or" in "Deena doesn't have any leisure or time") depended on rate of the surrounding speech, with fewer reports at slower rates. The current study investigated whether visual speech could reverse this speech rate effect. Auditory phrases with slowed context were presented with videos of the talker either clearly articulating the normal-rate function word or omitting visual articulation of the function word. Function word reports were higher when visual articulation of the function word was present, thereby reducing the expected effects of the slowed auditory context. Results suggest that visual speech is rapidly integrated in multimodal speech processing, overriding influences of distal speech rate.

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6:00-7:30 PM (5121)

Effect of Scale Type on Ratings of Perceived Listening Effort for Electrolaryngeal Speech. KATHLEEN F. NAGLE, Seton Hall University - Perceived listener effort (PLE) is a "partnerfocused" perceptual dimension used to identify the amount of work necessary to understand or listen to speech. Following total laryngectomy, most patients use electrolaryngeal (EL) speech as a primary or backup mode of communication. Because of its unique characteristics (e.g., radiated noise, monopitch), EL speech can be difficult to listen to. Previous research indicates that PLE ratings may uniquely differentiate EL speech when speech intelligibility and acceptability are roughly equivalent. Traditional visual-analog scales (VAS) have greater sensitivity than equal-appearing interval (EAI) scales; however, as sensitivity increases, listener reliability tends to decrease. This mixed-measures study examines whether scale type affects 1) PLE ratings of recordings of EL speech (N=101) with a wide range of intelligibility, or 2) listener (N=40) reliability for those ratings. VAS ratings will be converted from mm to 11-point EAI "scale value equivalents" for comparison. Data analysis is underway. Results will provide evidence for development of a more efficient way of measuring PLE and will complement research into objective measures of effort in adverse listening conditions.

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6:00-7:30 PM (5122)

Using Big Data to Investigate the Short-Term and Long-Term Synaptic Maintenance of Implicit Learning. MICHELLE R. KRAMER and PATRICK H. COX, George Washington University, STEPHEN R. MITROFF, George Washington University, DWIGHT J. KRAVITZ, George Washington University (Sponsored by Stephen Mitroff) – Behavior does not occur in isolation; humans constantly accumulate information and adapt their behavior with experience. We recently showed moment-by-moment evidence implicitly accumulates in a manner that considers both the strength and amount of prior evidence (Kramer, Cox, Mitroff & Kravitz, under review). This implicit accumulation was long-lasting, surviving across delays and interference. Here, we titrate the effect delay to examine consolidation of the implicit memory over the first 48 hours using a massive behavioral dataset from the mobile application Airport Scanner. Implicit evidence accumulation from a first session predicted behavior at the start of the next session if it occurred within 1 hour or after a delay of 12 hours to 2 days, but it did not predict performance after a delay of 1 to 12 hours. These time windows are consistent with established short-term (Mongillo, Barak & Tsodyks, 2008) and long-term (Kelleher, Govindarajan & Tonegawa, 2004) synaptic weight changes long-lasting depolarization and long-term potentiation, respectively. This pattern of consolidation supports proposals that implicit learning manifests as neural plasticity throughout the cortex (Reber, 2013).

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6:00-7:30 PM (5123)

Visual Statistical Learning in the Broader Autism Phenotype. AARON D. MITCHEL, JILL GOSLING, KAITLYN SLAGUS, and KRISTI KONG, Bucknell University - Prior work suggests that individuals diagnosed with autism outperform neurotypical controls in a visual statistical learning (VSL) task in which spatial dependencies between 2D objects are learned implicitly (Roser et al., 2015). In the present study, we investigated whether this benefit extends into the general population as part of the broader autism phenotype. Across two experiments with college students, we measured VSL ability in the spatial or temporal domains. We then measured participants' degree of autism-related traits using the Social Responsiveness Scale (SRS). Degree of autistic traits as measured by the SRS was positively correlated with VSL ability for spatial dependencies, but not temporal dependencies. This study is the first to document a relationship between autism symptomology and VSL in the general population. Our results suggest that enhanced spatial VSL is a continuous trait that is part of the broader autism phenotype (see Landry & Chouinard, 2016). Email: Aaron D. Mitchel, adm018@bucknell.edu

6:00-7:30 PM (5124)

Wakeful Rest Facilitates Processing Speed, but Not Sequence Learning, in Motor Sequence Tasks. PETER R. MILLAR, JARED LASSNER, and DAVID A. BALOTA, Washington University in St. Louis (Sponsored by David Balota) - Wakeful rest is a brief (e.g., 10 minutes) period of minimal stimulation. Recent experiments in declarative and spatial memory have reported that engaging in wakeful rest after encoding to-beremembered materials improves memory retention, compared to a distractor condition, possibly driven by consolidation during wakeful rest. However, this effect is underexplored in implicit memory. We tested whether wakeful rest would enhance motor sequence learning in two modified versions of the serial reaction time (SRT) task that have been shown to benefit from overnight sleep. Wakeful rest produced marginally greater improvement in processing speed compared to a distractor condition. However, this improvement might be driven by either greater learning of the task sequence or recovery from fatigue during wakeful rest. We more directly assessed sequence learning as slowing for random SRT blocks in comparison to repeated sequence blocks. This measure did not differ between the wakeful rest and distractor conditions for either SRT task. Together, these findings suggest that wakeful rest produces an immediate benefit in motor sequence processing speed, and there is no evidence that wakeful rest benefits the specific sequence being acquired.

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6:00-7:30 PM (5125)

Comparing the Relative Efficacy of Declarative and Implicit Number-Line Estimation Interventions for Second-Grade Students in Oman. ERIN N. GRAHAM and MAREN GREVE, Kent State University, IBRAHIM AL-HARTHY, Sultan Qaboos University, CHRISTOPHER A. WAS, Kent State University (Sponsored by Chris Was) - Although explicit declarative instruction doubtlessly plays an important role in mathematics education, it also places a heavy burden on children's working memory. This means that students with limited working memory resources are at a disadvantage when learning foundational math skills in a traditional educational context. However, recent research suggests that implicit learning techniques, which place fewer demands on working memory, can be successfully applied to mathematics education. Specifically, prior work found that a number-line intervention based on implicit learning techniques (like error-less learning or vanishing cues) was more beneficial than an intervention based on declarative instruction for American second-grade students. The present study sought to replicate and extend this work by comparing the relative efficacy of implicit and declarative number-line interventions for elementary students in Oman. Our findings have implications for both the utility of implicit learning techniques in mathematics education and for the cross-cultural study of number-line estimation. Email: Erin N. Graham, egraha17@kent.edu

6:00-7:30 PM (5126)

Discrimination of Neutral and Negative Stimuli in Healthy Adults At-Risk for Anxiety. MEGHAN D. CAULFIELD, AIDAN J. FLYNN, and IRENE P. KAN, Villanova University (Presented by Meghan Caulfield) - Recent research has found that persons at-risk for anxiety disorders show better discrimination in a pattern separation task with neutral stimuli. However, it is currently unknown whether discrimination differences extend to emotionally valenced images. In a 2x2 design, we compared discrimination performance of neutral and emotional images between-groups with high and low selfreported risk for anxiety. Participants completed an incidental encoding task followed by categorization of stimuli as old, new, or similar to those presented during encoding. Overall, results replicated previous research indicating enhanced discrimination for negatively valenced stimuli. Between-group analyses showed a significant interaction between risk for anxiety and performance, indicating that high-risk participants performed better at pattern separation (e.g. correctly classifying similar items) than those with low risk for anxiety. These results provide further support that individual differences in pattern separation may contribute to risk for anxiety.

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6:00-7:30 PM (5127)

Is a Picture Really Worth a Thousand Words? Evaluating Contributions of Fluency and Analytic Processing in Metacognitive Judgments for Pictures in Foreign Language Vocabulary Learning. JASON GELLER, University of Iowa, SHANA K. CARPENTER, Iowa State University - Previous research shows that participants are overconfident in their ability to learn foreign language vocabulary from pictures compared to English translations. Four experiments explored whether this tendency is due to processing fluency or beliefs about learning. Using self-paced study of Swahili words paired with either picture cues or English translation cues, picture cues garnered higher confidence judgments but not faster study times, and this was true whether judgments of learning were made after a delay (Experiment 1) or immediately (Experiment 2). In Experiment 3 when participants learned Swahili words with only one type of cue (pictures or English translations) and then estimated which one would be more effective for learning, the majority of participants believed pictures would be more effective regardless of whether they had experienced those cues during learning. Experiment 4 showed the same results when participants had experienced neither type of cue during a learning phase. These results suggest that metacognitive judgments in foreign language vocabulary learning are driven more by students' beliefs about learning than by processing fluency as reflected in self-paced study times.

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6:00-7:30 PM (5128)

Effects of Social Cues on Metacognitive Monitoring and Control. NING JIA, Hebei Normal University, LIZHUO RONG, Hebei University of Technology - People make choices and judgments on the basis of the information provided by perceptual cues and social cues. Our research paid much attention to study the effect of social cues on metacognition. In current research, the experiment materials consist of pairs of a Russian word and a picture, and the "majority-selected situation" serves as social cues. Our study uses eye-tracking technology to obtain the implicit data of metacognition. Then we compared these implicit data collected by eve-tracking with the explicit data of monitoring and control from oral report to analyze the influence of social cues on metacognitive monitoring, metacognitive control and their interrelation. Finally, we draw the conclusions: firstly, Metacognitive monitoring is strongly affected by social cues, which appears as 'believing others'. The implicit monitoring data is more accurate. Secondly, social cues have little influence on metacognitive control, which appears as 'believing oneself'. Thirdly, under the influence of social cues, the interrelation of metacognitive monitoring and control acts in this way the level of confidence affects the subsequent behaviors, and whether changing the choice or not in turn serves the level of confidence. Email: Jia Ning, jianing@hebtu.edu.cn

6:00-7:30 PM (5129)

Using Judgments of Learning as a Learning Strategy: More Effective Than Restudying, But Less Effective Than Retrieval Practice. KATHRYN T. WISSMAN, North Dakota State University – Recent research suggests that having learners make judgments of learning (i.e., predicting the likelihood of remembering information at a later point in time) during practice can enhance learning. However, one unanswered question is how making judgments of learning compares to engaging in retrieval practice for enhancing subsequent learning. Learners were asked to study related word pairs and then engage in different learning techniques: judgments of learning versus retrieval practice versus restudy. Learners then completed a final cued recall test after either a short delay (3 minutes) or a long delay (2 days). Outcomes showed that engaging in retrieval practice versus making judgments of learning was more effective for learning and retention, and that both techniques were more effective than engaging in restudy. Email: Kathryn T. Wissman, kathryn.wissman@ndsu.edu

6:00-7:30 PM (5130)

Metacognitive Judgment Accuracy for Tested and Non-Tested Expository Science Text. ALLISON J. JAEGER, St. John's University, LENA HILDENBRAND and CHRISTOPHER A. SANCHEZ, Oregon State University - Students tend to have poor metacomprehension accuracy when learning from expository text, meaning they cannot accurately diagnose what topics they do and do not know. Research has shown that learners perform better on retention tests after taking practice tests, and that test-taking can help learners make more accurate judgments of learning (JOLs) compared to restudying. One limitation of this previous work is that it has examined the impact of testing between-subjects, but not within-subjects. The present study examined the effect of testing on metacomprehension accuracy for multiple science texts. Participants read 6 texts, and then provided a JOL for each text. Inference practice tests were completed for half of the texts, and then participants gave a second JOL for all texts. Results indicated that JOLs were more accurate for the tested than non-tested texts. Further, second JOLs were more accurate for the tested texts, but less accurate for non-tested texts. These findings suggest that testing can improve metacognitive accuracy, but that students may falsely apply cues from their tested experiences to non-tested material. Email: Allison J. Jaeger, jaegerba@stjohns.edu

6:00-7:30 PM (5131)

Mindfulness and Metacognitive Monitoring Accuracy: Mindless Overconfidence in the Mindful. JESSICA D. MCCULLOUGH and ROBERT ARIEL, Virginia Wesleyan University - Mindfulness is characterized by a heightened state of awareness of one's own thoughts and feelings and may improve the quality of metacognitive processes necessary for effective self-regulation (Jankowski & Holas, 2014). The current study examined the relationship between trait mindfulness and metacognitive monitoring and control behaviors during learning. Participants completed the Mindfulness Attention and Awareness Scale (MAAS), the Metacognition Questionnaire (MCQ), and a learning task that involved two study-test blocks. The learning task required participants to control how they allocated their study time to material and to monitor the accuracy of their retrieved responses to test questions. Trait mindfulness did not predict monitoring accuracy or control behavior during study. Mindful individuals were just as overconfident in the accuracy of their retrieved responses as less mindful individuals which led to ineffective study-time allocation behavior. These results indicate that mindfulnessbased interventions may not actually improve the quality of metacognitive processes during learning. Email: Robert Ariel, rariel@vwu.edu

6:00-7:30 PM (5132)

Is there a Metacognitive "Trait"? Investigating Individual Differences in Performance Predictions. GABRIEL DIEGO SAENZ, Missouri State University, STEVEN SMITH and ANTON LEONTYEV, Texas A&M University (Sponsored by Steven Smith) - Students don't predict their test grades very accurately. If you are overconfident about how much you know, you might study less than you need to, so poor metacognition (inaccurate predictions) could lead to poor grades. It may be that individuals have different levels of "trait" metacognitive ability, and that these individual differences should be measurable above and beyond the effects of test circumstances. Furthermore, there may be multiple, independently significant factors that can account for predictive accuracy, such as test type, test knowledge (what is this test about?), and test performance (what are the answers?). In the present study, we investigate the contribution of individual differences, as well as multiple sources of information, in explaining people's prediction accuracy, above and beyond test performance or a simple "domain" explanation. Results have implications for the ways in which we view and attempt to improve metacognition. Email: Gabriel Diego Saenz, Gabriel.s@tamu.edu

6:00-7:30 PM (5134)

The Production Effect and Metacognitive Monitoring in Preschoolers. STACY L. LIPOWSKI, High Point University, ANGELA M. CANDA, John Carroll University, MARY A. PYC, Apple - Two experiments examined whether preschoolers are aware of the benefits of studying aloud over studying silently (the production effect). In Experiment 1, preschoolers studied pictures of familiar items and predicted whether or not they would remember each one later with a yes-no response. In Experiment 2, instead of making yes-no judgments at test, items that were studied aloud were paired with items that were studied silently. Children chose the picture they thought they would be more likely to remember later. In both studies children completed a free recall test after a distraction period The production effect obtained in both experiments. Children were extremely overconfident when making yes-no judgments (Experiment 1), but were more likely to predict that they would remember items studied aloud in the forced choice paradigm (Experiment 2).

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6:00-7:30 PM (5135)

Prior Judgment Experience Limits the Ability to Incorporate New Cues into Judgments of Learning. ELIZABETH A. GREEN and MICHAEL J. SERRA, *Texas Tech University* (Sponsored by Michael Serra) – The isomechanism theory of metacognitive judgments suggests that the passage of time alters the information available to make judgments of learning (JOLs). Our participants completed two study-judge-test phases involving 60-word pairs. One group made standard JOLs during both phases. A second group made standard JOLs during both phases and also re-made Phase 1 JOLs during Phase 2. A third group made (retrospective) Phase 1 and Phase 2 JOLs only during Phase 2. With the benefit of test experience, the third group achieved the highest accuracy at discriminating Phase 1 recall. The second group could also consult test experience and adjusted their judgments about Phase 1 recall on Phase 2, but they could not overcome the biasing effect of their original judgments. Although these results support the isomechanism theory, they also indicate that people might not be able to overcome past judgment experience to take advantage of newly available cues.

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6:00-7:30 PM (5136)

The Impact of Metacognitive Judgments on Restudy Decisions: An Ecologically Valid Study. ALISON ROBEY, CARLOS CASTILLO, JOSEPH HA, MARINA KERLOW, SIMRAN LUBANA, NEBYAT TESFA, and MICHAEL DOUGHERTY, University of Maryland, College Park (Presented by Alison Robey) - Deciding what items to restudy is an important aspect of self-regulated learning for college students. Previous studies show that learners who make Retrospective Confidence Judgments (RCJs, assessments of past retrieval success) make more accurate restudy decisions than learners who make Judgements of Learning (JOLs, assessments of future retrieval success). However, these studies did not use ecologically valid stimuli or delays. This study increased the ecological validity of the previous findings by introducing a more realistic delay (24 - 48 hours) and using more ecologically valid stimuli (Swahili-English word pairs and facts about Kenya). The previous findings, of RCJs leading to more accurate restudy decisions than JOLs, replicated with the more ecologically valid design. Additionally, new patterns emerged relating to the different types of stimuli. Metacognitive judgments were more accuracy for word-pairs than facts, and participants were more likely to choose to restudy unknown word-pairs than unknown facts. Email: Alison Robey, alisonrobey@gmail.com

6:00-7:30 PM (5137)

Small Nudges to Encourage Use of Effective Learning Strategies. LISI WANG, University of Texas, Austin, VERONICA X. YAN, University of Texas, Austin, KATHERINE MUENKS, University of Texas, Austin, EMILY Q. ROSENZWEIG, University of Wisconsin-Madison – In a series of studies, we show that undergraduates know about effective learning strategies (e.g., testing, self-explanation), but often do not use them while studying, and explore whether small nudges can prompt better strategy use. In study 1 (N = 200), we asked students to describe how "smart" or "strategic" students would prepare for an exam. In their responses, most participants strongly endorsed testing and self-explanation strategies. So, why is it that students can recognize but do not engage effective learning strategies? In study 2 (N = 38), a survey of undergraduates enrolled in a course about learning, memory, and motivation attributed their low use of effective strategies mainly to costs in time (58%) and anxiety (26%). In study 3, undergraduates read vignettes that characterize effective strategies as: (a) more vs. equally time-consuming; and (b) more vs. less anxiety-producing than less effective alternatives. We explore how small nudges in how strategies are characterized can lead undergraduates to select more effective strategies (e.g, testing) over less effective alternatives (e.g., rereading) in a self-regulated learning task. Email: Lisi Wang, lisi.wang@utexas.edu

6:00-7:30 PM (5138)

Influence of Summary Type on Metacomprehension Accuracy. ERIN MADISON and ERIKA K. FULTON, Idaho State University - Metacomprehension, the ability to monitor and regulate reading, can facilitate efficient studying. Individuals have low relative accuracy, meaning they cannot adequately differentiate well known from less well-known information. Delayed written summarization increases relative accuracy, so this study compared written summaries to oral summaries to test summary modality's impact on metacomprehension accuracy. Summary modality leads to differences in summary characteristics and thus metacomprehension cues, which can influence relative accuracy. Participants in an oral, written, or no summary condition first read and summarized passages, judged their comprehension, and took a multiple-choice test on the passages. Only the written condition exhibited relative accuracy significantly greater than zero. Of the summary characteristics measured (word count, summary quality, summary time, latency to begin summarizing), only word count and summary time influenced relative accuracy. The results have implications for the accessibility and situation model hypotheses, and practical applications for study habits. Email: Erika K. Fulton, fulterik@isu.edu

6:00-7:30 PM (5139)

Scheduling of Math Practice: Do Undergrads Intuitively Plan to Space and Interleave? MARISSA K. HARTWIG, DOUG ROHRER, ROBERT F. DEDRICK, and CHI-NGAI CHEUNG, University of South Florida - Many classroom studies have shown that math learning can be enhanced by spaced and interleaved arrangements of math practice problems (e.g., Rohrer, Dedrick, & Stershic, 2015; Hopkins, Lyle, Hieb, & Ralston, 2016). Whether students would intuitively use these arrangements when designing a learning schedule is unknown, however. Thus, we created a scheduling task in which participants designed schedules intended to maximize learning in a math class by arranging two weeks of lessons and practice problems. A total of 193 undergraduates created these schedules. The schedules were then evaluated for evidence of spacing and interleaving and also categorized by type. We found considerable variability in the schedules, though some common arrangements did emerge. Many but not all undergrads incorporated some spacing into the schedules they designed, but the need to educate students about the value of spaced and interleaved math practice was evident.

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6:00-7:30 PM (5140)

Memory and Metamemory for the Location of Items: The Effects of Information Importance and Encoding Difficulty. ALEXANDER L.M. SIEGEL, SHAWN T. SCHWARTZ, and ALAN D. CASTEL, University of California, Los Angeles (Sponsored by Alan D. Castel) - When information exceeds memory capacity, people are able to selectively prioritize and remember high-value information, even under divided attention. We assessed how accurately participants monitored spatial memory performance as a function of information importance and encoding difficulty. Participants studied items paired with points indicating their importance in a grid display and were then tested for the location of each item. Encoding difficulty was varied via presentation format (sequential or simultaneous) and a secondary task. Participants made confidence judgments for each item they replaced as well as global assessments of performance on multiple trials. Participants had better recall and greater confidence for items of higher value. Item judgments were more accurate in less demanding encoding conditions, while global judgments did not differ significantly. Thus, spatial metamemory appears to be sensitive to the importance of items and can be influenced by encoding difficulty, suggesting that strategic attentional processes may inform metacognitive judgments.

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6:00-7:30 PM (5141)

Dual-Retrieval Models and Metamemory in Younger and Older Adults. MINYU CHANG and CHARLES BRAINERD, Cornell University (Sponsored by Charles Brainerd) - Older adults often displayed weaker correspondence between retrospective confidence judgment and memory accuracy than younger adults, suggesting age declines in metamemory. However, the underlying mechanism for such age declines remains an open question. The goal of the study was to determine to what extent age differences in verbatim- and gist-related retrieval processes could explain age differences in metamemory. Here, we factorially manipulated the verbatim and gist content of word lists during encoding. During retrieval, younger and older adults completed three consecutive free recall tests, and rated confidence in their recall accuracy. Fuzzy-trace theory's dual-retrieval model was used to estimate verbatimand gist-related retrieval processes, and metamemory accuracy was measured by the correspondence between recall accuracy and confidence judgment. The results show that both verbatimand gist-related processes predicted metamemory accuracy, but only verbatim-related processes mediated the effects of age on metamemory accuracy and gist-related processes did not. The finding suggests that age declines in metamemory accuracy could be greatly attributed to age declines in verbatim memories.

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6:00-7:30 PM (5142)

Do Emotions Increase or Decrease Memories and Their Judgment? TSUYOSHI YAMAGUCHI, *Nippon Institute of Technology*, YOSHIFUMI TAKAHASHI and RYOSUKE KANEKO, *Hosei University* – There have been previous studies

that have examined the effect of emotions on memory and memory judgment, by word pairs that used the same valence for target and cue words. The purpose of our study was to clarify the following a question: Do emotions have an effect on enhancing memory recall and memory judgment? To address this question, we conducted a cued-recall experiment that controlled the emotion of the cue word (e.g., negative cue word and neutral target word), with 24 undergraduates as participants. Participations were first asked to learn the word pair (5 s), following which a fixation point appeared (0.5 s)on one of the pairs that was required to be remembered later. Results showed that when the emotional value of the cue word was positive or negative, JOL was expected to be higher than neutral. However, cued-recall was not significantly different between emotions. The same tendency was observed when the procedure of informing participants about the target word before presenting the cue and target word pair was followed. Hence, we concluded that emotions may not enhance the memory consolidation, but rather may let the learner feel like that he memorized the things correctly.

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6:00-7:30 PM (5143)

How Do Social and Emotional Cues Influence Monitoring of Learning for Adolescents with Autism Spectrum Disorder? AMBER E. WITHERBY, SARAH UMA TAUBER, and PAIGE E. NORTHERN, Texas Christian University, JENNIFER E. KING, Vanderbilt Law School (Sponsored by Sarah Tauber) - Although adolescents diagnosed with Autism Spectrum Disorder (ASD) often show deficits in episodic memory, their ability to monitor their learning can be equivalent to that of typically developing (TD) adolescents. Even so, researchers have only investigated this issue using neutral word stimuli. ASD is often characterized by difficulties recognizing emotion and responding appropriately in social situations. Thus, group differences may arise when monitoring learning based on social and emotional cues. To evaluate this possibility, adolescents (ASD and TD) studied pictures that were emotional or neutral and that had a social component or did not. They made a judgment of learning (JOL) for each picture and took a freerecall test. Both groups gave higher JOLs to emotional relative to neutral pictures and to non-social relative to social pictures. Thus, ASD and TD adolescents appear to use similar cues when monitoring their learning of emotional information. Email: Amber E. Witherby, amber.witherby@tcu.edu

6:00-7:30 PM (5144)

The Relationship Between Confidence and Inaccurate Beliefs: An Examination Involving Health Misconceptions. NIKITA A. SALOVICH, CARLIE E.A. COPE, and DAVID N. RAPP, *Northwestern University* – Concerns about the prevalence of inaccurate information has motivated research on when and why misconceptions influence people's judgments and behaviors. Confidence is a crucial consideration, as overconfidence is associated with an increased reliance on inaccurate beliefs. This project interrogated such findings by examining whether confidence in one's health knowledge is associated with the endorsement of health misconceptions. People who were most confident in their health knowledge indeed possessed more physical (e.g., only old people have arthritis) and mental health (e.g., mental illness is contagious) misconceptions, even after controlling for factors including verbal reasoning, news literacy, and demographic variables. Overconfidence may reduce one's willingness to engage in more effortful information seeking on a topic, which is particularly worrisome for health-related issues. These and other findings implicate confidence as an intriguing target for interventions intended to address people's misunderstandings, and for modifying the behaviors that can arise from misconceptions about the world.

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6:00-7:30 PM (5145)

Elaboration and Truth: What Helps Now, Hurts Later. MADELINE JALBERT, University of Southern California, ERYN NEWMAN, Australian National University, NORBERT SCHWARZ, University of Southern California, DEVA LY, Australian National University (Sponsored by Norbert Schwarz) - Fluently processed information is more likely to be accepted as true. Elaborating on the content of information may reduce reliance on fluency in the short run but may also increase fluency when the information is encountered again. Using Need for Cognition (NFC), an individual difference variable that captures one's preference for elaborative thought, we tested the influence of elaboration on the size of the truthiness effect, a bias to believe claims that are accompanied by nonprobative photos, and the illusory truth effect, a bias to believe claims that have been repeated. Being high in NFC decreased the influence of nonprobative photographs on acceptance of claims (experiments 1-3) but increased the influence of prior exposure to claims (experiments 4-5). We conclude that elaboration does not consistently protect against fluency-induced biases in truth judgment. Elaborative processing reduces the impact of fluency when the judgment is made at initial exposure, as in the truthiness paradigm, which reduces bias. But initial elaborate processing enhances fluency when the claim is re-encountered, as in the illusory truth paradigm, which increases bias. Email: Madeline Jalbert, mcjalber@usc.edu

6:00-7:30 PM (5146)

Do People Expect to Forget News Events? NATE KORNELL and JOSHUA FIECHTER, *Williams College* (Presented by Nate Kornell) – People do not expect to forget much. If two groups of participants are asked how many word pairs they will remember, either in a few minutes or in a week, their answers are about the same (Koriat, Bjork, Sheffer, & Bar, 2004). We asked whether this stability bias extends to naturalistic materials. The day after a news event, such as Aretha Franklin's death (RIP) or the soccer world cup, participants were asked how many of their peers would remember a fact about the event, either in one day (immediate group) or three months (delayed group). The predictions were equivalent in four experiments, demonstrating a stability bias. Delayed-group predictions were lower in the other two, when 1) the event seemed highly memorable and 2) the judgment prompt included the date of the event. In conclusion, our participants did not expect to forget news events under some, but not all, conditions.

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6:00-7:30 PM (5147)

Do Confidence Judgments Influence College Students' Decisions to Change Answers on a Multiple-Choice Test? AMANDA R. LIPKO-SPEED, The College at Brockport, STEPHANIE BUCHERT and ERIC L. LAWS, Longwood University, LORANN KEARNEY, BAILEY WAGAMAN, CLAIRE WOLF, and CYAN GUMBS, The College of Brockport, TAYLOR MORGAN, ALAINA SCOTT, LAIA SCOTT, and TONI FRATTINI, Longwood University - We investigated the influence of confidence judgments on students' answer-changing behaviors during a test, and whether these judgments would produce reactive effects similar to those from previous research that incorporated other types of metacognitive judgments. In Experiment 1, participants completed a 26-question multiple choice test in paper format. In Experiment 2, participants took the same 26-question test online, accompanied by an unobtrusive evetracker apparatus. During the tests, some students rated their confidence about answers after each question, others rated their answer confidence per question after having answered all 26 questions, and still others made no confidence judgments. In all conditions across both experiments, participants had the opportunity to change any answers they wished after completing the test. Results showed that presence and type of confidence judgment did not significantly affect the number of answers changed or the number of correct answers on the test. In addition, whether the test was taken online or on paper did not affect answer changes or test performance. Eyetracker data, such as whether participants looked longer at an answer they would later change, were also examined.

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6:00-7:30 PM (5148)

Phenomenology of Retrieval as Memories Transition from Events to Knowledge: Evidence from Retrieval Success and Failure of Recent Public Events. JEN COANE, Colby College, SHARDA UMANATH, Claremont McKenna College, TAMAR CIMENIAN and KAI CHANG, Colby College - Public events such as celebrity news, tragedies, and political events are widely experienced. Initially, memories of these events are episodic in nature; however, these events are also stored in associative networks similar to the semantic organization of knowledge (Brown, 1990). To examine how such events are stored and retrieved from memory, younger and older adults attempted to answer questions about events occurring over the last 10 years. When retrieval failed, not remembered items were recognized with higher accuracy than not known items, suggesting that information that was stored but temporarily inaccessible resulted in a different phenomenological experience than information that was not available, akin to retrieval from the knowledge base. When retrieval was successful, it was classified as remembered more than known. Interestingly, errors were remembered more often than known. Thus, memory for public events shares phenomenological features with episodic/event memory. In a follow-up 2 years later, these events showed minimal forgetting, suggesting they bear some resemblance to semantic memories. Public events thus allow researchers to examine the transition of memories from one store to another over time.

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6:00-7:30 PM (5149)

How and When Does Perceptual Fluency Impact Predictions of Future Memory Performance? SKYLAR J. LAURSEN, EVAN E. MITTON, JASMYN SKINNER, and CHRIS M. FIACCONI, University of Guelph (Sponsored by Chris Fiacconi) - Judgments of learning (JOLs) are predictions of future memory performance based on individuals' evaluation of prior learning. There has been considerable interest in understanding how individuals make these judgments and recent theorizing has speculated that JOLs are derived from the implicit utilization of a variety of different cues, of which only some are indicative of future memory performance. The present series of experiments examine the role of one particular cue, perceptual fluency (i.e., ease of perceptual processing), in guiding JOLs. Using a methodological approach adapted from Masson (1986), we demonstrate, across five experiments, that perceptual fluency can be used to inform predictions of future memory performance, but that its influence is dependent upon the specific task requirements at the time JOLs are made. Our results point to potential reactivity when using overt measures of perceptual fluency, which may pose challenges when investigating of the role of fluency in memory predictions. Email: Skylar J. Laursen, slaursen@uoguelph.ca

6:00-7:30 PM (5150)

What Cues Do People Think They Use to Make Metacomprehension Judgments? DEREK J. HANSON, University of Texas at Austin, VERONICA X. YAN, University of Texas at Austin - Metacomprehension research typically focuses on a single cue reported by readers, yet we know that readers' judgments can be influenced by multiple cues (Jaeger, 2012). In the present study, participants read a series of text passages on astrological phenomena, made metacomprehension judgments, reported and weighted the cues they used to make their judgments, and then took a comprehension test. We categorized these cues as relating to shallow processing (fluency, effort), to deep processing (summarizing, visualizing), or to prior knowledge and beliefs (self-efficacy, interest). The majority (66%) reported using multiple cues. Overall, readers relied most on shallow processing cues, followed by deep processing cues, and finally prior experiences. Although subject to self-report limitations, regression analyses yielded interesting patterns: those who reported just a single cue, who relied on prior knowledge, or who reported using the deep processing cues scored higher on the final test. Deep processing cues also typically related to higher JOLs, but not to metacognitive accuracy. Self-efficacy and effort were also related to JOLs, but not to test performance, resulting in overconfidence (selfefficacy) or underconfidence (effort).

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6:00-7:30 PM (5151)

Failure to Demonstrate the Hypercorrection Effect in Episodic Memory. DANIEL A. SCHEIBE and DANIELLE M. SITZMAN, Eastern Washington University - Counterintuitively, people are more likely to correct high-confidence errors compared with low-confidence errors (i.e., the hypercorrection effect). The attentional capture account asserts that people pay more attention to feedback following high-confidence errors, while the knowledge account suggests that error correction is facilitated by related domain knowledge (which also increases response confidence and attention to feedback). The current experiments assessed whether response confidence would impact error correction in the absence of domain knowledge. After studying word-pairs, participants were shown the cue word for each pair and asked to provide the target word, rated their confidence in their response, and were shown the correct answer. Following a short delay, participants took a final test of the same word-pairs. Overall, confidence in errors on test 1 was unrelated to the likelihood of correcting an error on test 2. Additionally, follow-up experiments demonstrated that attention to feedback did not increase following highconfidence errors.

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6:00-7:30 PM (5152)

Do Reactive Effects of Judgments of Learning Extend to Word Lists? AMANDA R. STEVENS and BENTON H. PIERCE, Texas A&M University, Commerce (Sponsored by Benton Pierce) - Previous studies have shown that making judgments of learning (JOLs) after studying related word pairs can enhance later memory for those pairs (e.g., Mitchum, Kelley, & Fox, 2016; Soderstrom, Clark, Halamish, & Bjork, 2015). We investigated whether these reactive effects of JOLs extend to lists of individual words. In Experiment 1, we replicated the enhancement effect of JOLs on paired associates, finding that cued recall was greater following JOLs compared to a no-JOL condition, but only when the pairs were strongly related. In Experiment 2, we used categorized lists and two types of JOLs: (a) an immediate, individual-item scale (0-100) JOL; and (b) an immediate, individual-item dichotomous (remember/ forget) JOL, but found no effect of either type of JOL on cued recall. In Experiment 3, we used the same categorized lists as in Experiment 2 and elicited global JOLs (i.e., after all list items were studied) rather than individual-item JOLs. We found that cued recall performance was enhanced following global JOLs compared to when no judgments were made. These results suggest that JOLs can enhance later memory for categorized (i.e., related) word lists, but only when the judgments are global in nature.

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6:00-7:30 PM (5153)

Metamemory for Naturalistic Scenes: Assessment of Accuracy and Cue Utilization. MONIKA UNDORF and ARNDT BRÖDER, *University of Mannheim* – Memory for naturalistic pictures is exceptionally good. However, little is known about people's ability to monitor the memorability of naturalistic pictures. We report the first systematic investigation into the accuracy and basis of metamemory in this domain. People studied pictures of naturalistic scenes, predicted their chances of recognizing each picture at a later test (judgment of learning, JOL), and completed a recognition memory test. Across three experiments, people's JOLs revealed substantial accuracy. This accuracy was due to people basing their JOLs on multiple cues that predicted recognition memory. Identified cues included intrinsic picture attributes and extrinsic aspects of the study situation. This work provides a better understanding of metamemory for pictures, and it demonstrates close parallels between metamemory for naturalistic scenes and verbal materials.

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6:00-7:30 PM (5154)

Emotional Expression and Angle of Presentation Differentially Influence Predictions and Performance for Face Recognition. HELEN L. WILLIAMS and GEORGINA EARDLEY, Keele University - In this experiment we tested how participants' predictions of future recognition, and their subsequent performance, are influenced by varying whether emotional expression and/or angle of presentation are matched (or not) across study and test. Participants studied 32 faces, showing either a happy or neutral expression, and shown either facing to the front or 45 degrees to the side. Participants were instructed to make a judgment of learning (JOL) predicting their later recognition for each face but were warned that at test some faces would be shown at a different angle and/or showing a different emotion. JOLs were higher for happy vs. neutral faces, and higher for faces studied front-on vs. sideon. Overall, recognition did not differ for faces studied with a happy or neutral expression but faces that had been studied front-on were better recognized than faces studied facing the side. Crucially, for hit rate there was also a four-way interaction between study expression, study angle, and whether expression and/or angle matched across study-test. Patterns suggest that the relationship between predictions and performance for faces is influenced more strongly by angle of presentation than by emotional expression.

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6:00-7:30 PM (5155)

Choosing What to Learn: The Benefits of Choice for Children's Memory of Novel Facts. LILY FITZGIBBON, GRETA FASTRICH, JOHNNY LAU, and KOU MURAYAMA, University of Reading - Recent research has suggested that children and adults learn better when they have control over the sequence and timing of learning episodes (Ruggeri et al., 2019). However, previous research compared conditions in which participants could choose their study sequence with randomly selected study sequences. Thus, it is not yet known whether the benefit comes from the sequences participants chose or from the choice itself. In the current research, children aged 5 to 11 (N = 347) first learned novel facts about cartoon aliens and were then given a surprise memory test. Half the children selected the information to learn for themselves and the other half followed the choices of another (age-matched) child. Memory performance was better among children who made their

own choices than those who followed another child's choices and improved with age. In an exploratory analysis of choice systematicity, we found that systematic choice selections (e.g., consecutive returns to the same alien) were more beneficial for children in the choice condition than the follow condition. These findings indicate that choice itself facilitates learning and boosts the benefits conferred by systematic information sequences.

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6:00-7:30 PM (5156)

"50 First Dates": A Community-Based Research and Service-Learning Project in a Senior Level Cognitive Psychology Course. RENEE M. PENALVER, Coe College, LINDSAY GLYNN, Aging Services of Cedar Rapids, GABRIEL DOUGLASS, KEI YOSHIDA, and MEGHAN GOLDER, Coe College, KAYLA HUTTON, Aging Services - Community engagement is a teaching technique to help students learn about complex concepts through applying their knowledge to the community in a meaningful way. Evidence suggests there is better long-term retention when information is processed on a deep level (Craik & Lockhart, 1972). Community engaged classrooms provide an opportunity for students to learn and process the class information on a deeper level than lecture alone; using this logic, we anticipate that there will be stronger connections to the material and classroom learning. Students in an upper-division memory and cognition capstone course were required to complete a community engagement project with individuals impacted by Dementia. Students spent a semester creating a digital story of those impacted by Dementia, and used theories in memory and cognition to reflect on their experiences. We have preliminary data on student self-reported measures of their experiences with this project, and objective measures (e.g. data from their exams), all indications are that community engagement in the classroom is positive, impactful, meaningful, and facilitates learning.

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6:00-7:30 PM (5157)

Matching Odor Does Not Reinstate Context. DUSTIN FINCH and DEBORAH K. EAKIN, Mississippi State University (Sponsored by Deborah Eakin) - Previous research shows that when the environmental context at testing (e.g. room) matches the environmental context at study, memory is better than if the two are different, a finding known as the context reinstatement effect (Godden and Baddely, 1985; Smith, 2013; Smith & Vela, 2001). The purpose of our experiments was to determine whether odor could serve as an environmental context cue, producing the context reinstatement effect when odors match between study and test (Isarida & Isarida, 2014; Isarida et al, 2014). Two experiments manipulated the odor context to match or not between the study and test of a list of categorical words. In both experiments, memory was not better when the test odor context matched the study odor context as compared to when it did not; the context reinstatement effect was not found. These findings are problematic for context reinstatement research. Email: Dustin Finch, df979@msstate.edu

6:00-7:30 PM (5158)

Beyond the Norms: Using Normative Ratings to Determine **Emotional Valence May Obscure Emotional Memory Effects.** ETHAN FLURRY and DEBORAH K. EAKIN, Mississippi State University (Sponsored by Deborah Eakin) - Emotional memory effects such as positivity bias or the positivity effect are attributed by the socio-emotional selectivity theory (Mather & Carstensen, 2005) to a goal-oriented shift towards processing of positive information. However, studies failing to find effects (e.g., Gruhn, Smith, & Baltes, 2005) have complicated this literature. One potential explanation is that using normative ratings of emotional valence may fail to account for individual experiences of positivity. Experiment 1 examined whether using normative versus individual ratings to categorize words as positive or neutral impacted the positivity bias typically observed for older adults. Experiment 2 examined whether using normative versus individual ratings impacted the positivity effect typically observed for younger adults. In both experiments, we found that neither age group demonstrated the typical effects using normatively rated words, but both effects were obtained for individually rated words. Inconsistent findings may be attributed to the use of norms to study emotional memory.

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6:00-7:30 PM (5159)

The Survival Advantage in Bilingual Populations: A Depth of Processing Account. STEPHANIE A. KAZANAS, Tennessee Technological University, RACHEL B. FERNANDES and JEANETTE ALTARRIBA, University at Albany, SUNY - Craik and Lockhart's (1972) depth of processing account suggests a memory benefit for words processed in a deep, meaningful way. Recent adaptive memory work has shown a particular memory benefit for words processed according to their survival-relevance (Kazanas & Altarriba, 2015; Nairne & Pandeirada, 2016). In this study, we examined this depth of processing account with bilingual participants, across shallow and deep levels of processing, as well as bilinguals' dominant and non-dominant languages (e.g., Ayçiçegi-Dinn & Caldwell-Harris, 2009). Depth of processing was investigated with (1) shallow, pleasantness ratings, and (2) deep, survival-relevance ratings. We hypothesized that deeper processing for bilingual participants in the survival condition using their dominant language, will better match a typical monolingual sample than bilingual participants using their nondominant language. Our results speak to the on-going effort to better understand word processing differences across bilinguals' dominant and nondominant languages.

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6:00-7:30 PM (5160)

The Effects of Shared Experience on Retrieval Induced Forgetting. ELIF SOZER and WILLIAM HIRST, *The New School for Social Research* (Sponsored by William Hirst) – Selected rehearsal of material from a category might lead to items in that category to be less accessible than unrelated and unrehearsed material in another category. This effect, Retrieval Induced Forgetting (RIF), has been replicated in P

various experimental settings, and found to happen in dyadic conversations when both members are concurrently retrieving. Recent work on shared attention suggests that when people attend to the same stimuli as a group, they tend to channel more resources to it and synchronize their collective cognition. To see the effect of shared attention on RIF, participants read a text about Dungeons and Dragons, and selectively retrieved the text via "fake" tweets that had varying degrees of likes and retweets serving as a manipulation of the degree of shared attention. After answering whether they would like or retweet, they had the final recall test. The results are discussed in terms of RIF and how shared attention moderates it.

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6:00-7:30 PM (5161)

Group Differences in the Influence of Category Expectations On Episodic Memory In Early Childhood. KIMELE PERSAUD, Rutgers University, Newark - Previous research evaluating the influence of category knowledge on memory found that children, like adults, rely on category information to facilitate recall (Duffy, Huttenlocher, & Crawford, 2006). A model that combines category and target information (Integrative) provides a superior fit to preschoolers recall data compared to a category only (Prototype) and target only (Target) model (Macias, Persaud, Hemmer, & Bonawitz, in revision). Utilizing data and computational approaches from Macias et al., (in revision), we explore whether individual and age-related differences persist in the model fits. Results revealed that a greater proportion of preschoolers recall was best fit by the Prototype model and trials where children displayed individuating behaviors, such as spontaneously labeling, were best fit by the Prototype model. Furthermore, the best fitting model varied by age. This work demonstrates a rich complexity and variation in recall between developmental groups that can be illuminated by computationally evaluating individual differences.

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6:00-7:30 PM (5162)

Examining the Usefulness of Thought Substitution for Directed Forgetting Among Individuals with High Trait Anxiety. JENNIFER GALLANT and BILJANA STEVANOVSKI, University of New Brunswick - Previous research highlights impaired directed forgetting--the ability to intentionally forgetting information -- among individuals with affective difficulties (e.g., depression, anxiety), who experience increased negative thoughts and memories. The current study examined the utility of thought substitution, where substitute stimuli replace to-be-forgotten stimuli, to improve directed forgetting among individuals with high trait anxiety. Participants with varying trait anxiety levels (N=119) learned positive, negative and neutral adjective-noun word pairs (e.g., happy/lonely/lasting memory), and completed a Think/No-Think task. Participants in the Thought Substitution group were told to think of substitute words instead of original targets on No-Think trials. Participants' memory for the original words was then tested. Successful directed forgetting of positive and negative words (i.e., better final recall of "Think"

words than "No-Think" words) was observed, regardless of trait anxiety level and whether substitute words were provided. Results highlight the selective control of memory, which is imperative to remembering important details and forgetting unwanted information and may serve as a useful emotion regulation strategy.

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6:00-7:30 PM (5163)

Retrieval Induced Forgetting for Emotional Materials. NOAM NEWBERGER, New School for Social Research, JEREMY YAMASHIRO, Washington University in St. Louis, ELIF SOZER, ADAM BROWN, and WILLIAM HIRST, New School for Social Research (Presented by Noam Newberger) (Sponsored by William Hirst) - Selective retrieval of previously learned material can cause related but un-retrieved material to become relatively less accessible than un-retrieved but unrelated material. This retrieval induced forgetting (RIF) has been demonstrated for many types of material. Studies on RIF of emotional material, however, have yielded mixed results. The current study examined whether selectively retrieving neutral elements of narrative material could induce forgetting for emotional elements. Participants read a series of short vignettes composed of emotional and neutral propositions. They rated each proposition for emotional strength, then selectively retrieved propositions from a subset of the stories. After completing a cued recall phase that served as selective retrieval practice, they attempted a final cued recall of each story. Following the final recall, participants rated individual propositions for emotional strength again. We discuss how retrieval induced forgetting might impact the perceived emotional strength of memories.

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6:00-7:30 PM (5164)

The Role of Initial Testing on Collaborative Inhibition and Post Collaborative Recall. SUMMER R. WHILLOCK, MICHELLE L. MEADE, and AMBER N. LUCAS, Montana State University - In the present experiment, we examined how an initial test influences collaborative inhibition (reduced recall in collaborative groups relative to the non-redundant pooled recall of the same number people who recall individually) and post collaborative recall. Participants studied categorized word lists and were randomly assigned to either take an individual recall test prior to collaboration or to complete a filler task. Results indicate that for both correct and false recall, initial testing had no influence on the magnitude of the collaborative inhibition effect; collaborative inhibition manifested to the same degree, regardless of whether or not participants took an initial recall test. However, on a subsequent individual recall test, prior collaboration increased correct recall, and taking an initial test increased correct recall. Prior collaboration and initial testing had no lasting effect on false recall. Initial testing influences veridical, but not false recall on post collaborative tests. Email: Michelle L. Meade, mlmeade@montana.edu

6:00-7:30 PM (5165)

Individual Differences in Relearning from Long-Term Memory. RUTH A. SHAFFER, THOMAS SPAVENTA, CHRISTOPHER L. ZERR, and KATHLEEN B. MCDERMOTT **Q**, Washington University in St. Louis (Sponsored by Kathleen McDermott) - Prior work characterizing individual differences in learning has demonstrated that people who learn more quickly also recall more later (Zerr et al., 2018). However, it remains unclear whether fast learners retain their relative edge after a delay in terms of *relearning* previously learned information. When initial learning performance has been equated, are individual differences in learning efficiency maintained during relearning, or do slower learners gain more from the initial learning experience? To address these questions, participants (N=188) studied Lithuanian-English word-pairs, took repeated cued-recall tests using a dropout procedure with feedback, restudied the word-pairs, and relearned all items via cued-recall testing one week later. Faster learners relearned more quickly. Critically, however, slower learners showed greater savings in relearning. This was true even when analysis was restricted to the slowest half of subjects, overcoming potential ceiling effects. These findings provide insight into individual differences in the learning and relearning of information.

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6:00-7:30 PM (5166)

Evidence for Global Matching During Memory Recovery. JACK WILSON and AMY CRISS, Syracuse University - The act of recall includes sampling and recovery processes. Sampling is the selection of a memory trace to recall. Recovery is the act of transforming the sampled memory trace into a response. The SAM model's account of recovery states that the probability of recovery depends on the local strength of the target item. In this model, recovery probability should not be influenced by the memory of other studied items. We test this model assumption by allowing the to-be-retrieved target word in a paired associates cued recall test to either be related or unrelated to another untested word on the study list. This similarity manipulation is counterbalanced with the similarity of the cue word, which also either does or does not have a related word on the study list. Critically, the presence of a related target in the study list improves both correct response and intrusion rates, while the presence of a related cue increases intrusions, but not correct response rates. The presence of similar items on the study lists facilitates recovery in some fashion, suggesting the role of a global match process during recovery. Email: Jack Wilson, jhwilson@g.syr.edu

6:00-7:30 PM (5167)

Memory for Complex Events: Contributions of Visual and Auditory Perceptual Information. REBECCA SCHEURICH, CAROLINE PALMER, and SIGNY SHELDON, *McGill University* (Sponsored by Caroline Palmer) – Retrieving episodic memories involves the reactivation and reconstruction of information containing perceptual and non-perceptual (semantic) details. Although research has shown a link between visual imagery processes and episodic retrieval of visual information, little research has examined how other perceptual processes contribute to episodic memory. The current study examined the relative contributions of visual, auditory, and semantic details of complex events to episodic memory. Participants watched videos in which an actor conveyed different autobiographical events using visual, auditory, or semantic descriptors. Participants showed greater recall accuracy for event content conveyed using visual and semantic descriptors. Furthermore, participants were better able to recall visual descriptors in the original modality than auditory descriptors. In contrast, participants recalled semantic descriptors in the original (non-perceptual) modality equally well when they were presented in a context with visual or auditory descriptors. Together, these results suggest a bias toward visual information when retrieving elements of episodic memories.

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6:00-7:30 PM (5168)

Understanding Remember/Know Judgments in Free Recall. YOONHEE JANG, University of Montana, HEUNGCHUL LEE, NIR & Ajou University - Despite the assumption that free recall is based on recollection (usually indicated by Remember judgments), participants often gave Know judgments to recalled items, which were presumably based on familiarity. We investigated what these Know judgments mean in free-recall paradigms including confidence judgments and Remember/ Know judgments. In Experiment 1, which manipulated list length, accuracy was greater for short lists than for long lists, regardless of Remember/Know responses. Recall latency was shorter for short lists than for long lists, and was shorter for Remember responses than for Know responses. The majority of Remember and Know judgments were made with high confidence and high accuracy. The latency effect disappeared when these high-confidence Remember/Know responses were included. In Experiment 2, which manipulated presentation duration, accuracy increased as a function of duration, regardless of Remember/Know responses whereas latency did not differ. We discuss the possibility that both judgments reflect retrieval from the same search set.

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6:00-7:30 PM (5169)

Self-Referential Encoding Does Not Benefit Memory for Prior Remembering. MARCUS L. LEPPANEN, ANAYA S. NAVANGUL, GABRIELLA I. FEDER, DOMINOE A. JONES, and KYUNGMI KIM, Wesleyan University - Remembering previous acts of memory retrieval is important in everyday life. Changes in context across instances of memory retrieval can impair memory for prior remembering. Self-referential encoding can facilitate organization of incoming information. We examined whether referring to-be-remembered information to oneself at encoding could act as a contextual anchor to protect memory for prior remembering from subsequent context change. Participants related cue-target word pairs (e.g., hand-palm, dog-bark) to themselves or a celebrity. During Test 1, some targets were tested with the study cue (e.g., hand-p_ _m) while others were tested with a related cue (e.g., birch-b_ _k). During Test 2, all targets were tested with study cues and participants indicated whether the targets were retrieved during Test 1. Semantic context change impaired memory for prior remembering regardless of the referent, while performance was significantly better in a control condition in which word pairs were encoded alone.

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6:00-7:30 PM (5170)

Semantic and Temporal Structure in Memory for Narratives: A Benefit for Semantically Congruent Ideas over Time. REBECCA A. CUTLER, SARAH BROWN-SCHMIDT, and SEAN M. POLYN, Vanderbilt University - We applied analytic techniques developed for list-learning tasks to memory for short narratives to characterize their organizational structure in memory. Participants (n=22) studied six stories, tested with immediate written recall, and then delayed recall, 3 weeks later. Temporal effects such as primacy and the contiguity effect were strong during immediate recall; both were substantially weaker, but still present, at the delayed test. We used a vector space semantic model to create a representational vector for each 'idea unit' in each narrative, allowing us to calculate the semantic congruence of a given idea unit to the others in a narrative. We found that semantically congruent idea units were more likely to be recalled at the delayed test. Semantic structure seems to have increased importance as time passes: A positive relationship between degree of congruence and likelihood of recall was present at the delayed, but not immediate, recall tests. Email: Rebecca A. Cutler, rebecca.a.cutler@vanderbilt.edu

6:00-7:30 PM (5171)

Does Choosing What to Read Aloud Influence the Production Effect? DANIEL TODOROVIC and COLIN M. MACLEOD, University of Waterloo (Sponsored by Michael Masson) – Reading words or texts aloud results in a mnemonic benefit relative to reading words or texts silently the production effect. We sought to examine whether choosing what to read aloud would influence this benefit. In Experiment 1, we first demonstrated a within-subject production effect for text when participants read an entire article aloud vs silently. Then, in Experiment 2, we allowed one group of participants to choose what to read aloud whereas a second group of yoked participants had to read aloud what participants in the first group had chosen. Compared to an all-silent group, choice led to a benefit for aloud items, whereas not having a choice led to a cost for silent items.

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6:00-7:30 PM (5172)

In Search of the Proximal Cause of the Animacy Effect on Memory. HEATHER RAWLINSON and COLLEEN M. KELLEY, *Florida State University* – People recall and recognize animate words better than inanimate words, possibly because memory systems were shaped by evolution to prioritize memory for predators, people, and food sources. However, the proximal cause of this animacy advantage is not yet known. Attentional paradigms show an animacy advantage in change detection tasks and in the attentional blink, which suggests that the animacy advantage in memory could stem from enhanced attention during encoding. We test whether better recall (Experiment 1) and better recognition (Experiment 2) for animate items can be traced to enhanced attention at encoding by comparing the animacy effect under conditions of full versus divided attention at encoding.

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6:00-7:30 PM (5173)

How Does Recall Alter Memory? PETER SHEPHERDSON, University of Akureyri - A large body of evidence attests to the beneficial effect of retrieval on subsequent memory. However, research into the impact of retrieval on memory representations themselves is much more limited. In a series of experiments, I asked participants to repeatedly recall the colours of simple shapes from memory using a randomly-rotated colour wheel, to investigate how the process of recall affects memory. As participants repeatedly responded in the absence of feedback, the deviation of their responses from the initially-presented value gradually increased; yet simultaneously, the stability of their responses (e.g., the similarity of response n to response n-1) also increased. I used a mixture-modelling approach to assess the effectiveness of several plausible accounts for these data patterns, finding that the best candidates were models in which each recall attempt created a novel, noisy memory trace, with these traces subsequently combined to produce the following response. Further experiments produced findings consistent with this account.

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6:00-7:30 PM (5174)

Examining Factors that Modulate and Eliminate Contiguity in Free Recall. MIN KYUNG HONG, LISA K. FAZIO, and SEAN M. POLYN, Vanderbilt University (Sponsored by Sean Polyn) - In list-learning tasks, items that are studied together tend to be recalled together. This phenomenon, the contiguity effect, is remarkably robust, appearing under a wide variety of experimental conditions. Here, we attempted to determine the experimental conditions necessary to abolish the contiguity effect. Across five experiments, we examined continuity in single words, paired associates, and category-exemplar pairs. We varied the list length (up to 90), delay period (up to 15 minutes of engaging distraction) as well as the presence of retrieval practice. We find that task variants using paired associates and longer delay period do not significantly reduce the contiguity effect, but factors such as longer list length, emphasized semantic structure, and presence of retrieval practice can abolish the contiguity effect.

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6:00-7:30 PM (5175)

Directed Forgetting Without New Learning: Retrieving the "List Before the Last" to Forget? PETER F. DELANEY, *University of North Carolina at Greensboro*, LIZ T. GILBERT, *University of North Carolina at Greensboro*, MIHALY RACSMANY, *Budapest University of Technology and Economics* (Presented by Peter Delaney) – The context-change theory of list-method directed forgetting proposes that mental contextual change causes the forgetting. Context change cannot be selectively targeted, so forgetting should require new learning. Therefore, people cannot selectively forget the most recentlystudied list. However, recent studies showed that forgetting List 2 selectively (while retaining List 1) is possible. In Experiment 1, we made small changes to the original design and failed to replicate the earlier result. Experiment 2 reproduced it after changing the distracter task and making the memory task easier. Retrospective verbal reports in Experiment 2 suggested that people retrieved List 1 in order to forget. The results are similar to those seen in the "list before the last" paradigm, which has been explained via contextual change mechanisms. Email: Peter F. Delaney, p_delane@uncg.edu

6:00-7:30 PM (5176)

Experiences of Agency Influence Memory for Moral Behavior. ZACHARY J. BUCKNOFF and JANET METCALFE, Columbia University (Sponsored by Janet Metcalfe) - In two experiments, we explored whether subjective experiences of agency (SEA) affect recall for descriptions of moral and immoral behavior. In experiment #1, we manipulated SEA by using different versions of a simple videogame that varied in the feelings of agency elicited. Each trial consisted of gameplay followed by presentation of a vignette. We created and/or adapted vignettes to depict morally right, morally wrong, or ambiguous behavior. Participants gave sliding-scale self-report judgments of agency in response to gameplay and morality ratings for the vignettes. Free recall of the vignettes was assessed following completion of all trials. Experiment #2 followed the same procedure except we increased the number of trials, strengthened polarization of the vignettes, and eliminated morally ambiguous vignettes. Results from both studies showed an interaction such that recall was impaired for moral rather than immoral behavior encoded following experiences of low agency but not after high-agency experiences. The findings may suggest that when a person's ability to control their environment is obstructed, they may become more attuned to threats or transgressions. Email: Zachary J. Bucknoff, zjb2108@columbia.edu

6:00-7:30 PM (5177)

The Encoding and Retrieving Manners Influence the Recognition of Socially Interacted Faces. BO YANG, JIA LIN, and GUOMEI ZHOU, Sun Yat-sen University (Sponsored by Guomei Zhou) - Understanding and memory others in various social interaction situation is a crucial skill. Recent evidence indicates that biological motion people or real people with face and body were better memorized in the social interaction condition, which suggest that stimuli would be bound or chunked as a whole unit. However, it remains unclear whether this facilitation caused by social binding will occur for face recognition. Participants were observing either dynamic or static paired faces under three interaction conditions (Approach, Avoidance, Non-interaction) in the encoding stage. In the following retrieving stage, they need to determine whether the single or paired faces were learned or not. Results confirmed facilitation effect of face motion in the encoding stage. However, this effect was only observed in correct rejecting new faces, and in the avoidance and non-interaction conditions, but not in approach condition. Results revealed a better performance when retrieving single faces than that for paired faces, and this effect was observed more in avoidance condition relative than other two conditions.

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6:00-7:30 PM (5178)

The Attentional Boost Effect at Retrieval Creates False Memories. MATTHEW W. PRULL, YUTONG LIU, SARAH A. HIGDON, and ZACHARY R. CALO, Whitman College - The attentional boost effect (ABE) is a counterintuitive phenomenon of divided attention on memory in which words that are co-presented with target items in an unrelated detection task are remembered better than words that are copresented with distractors. Here we report two experiments that examine whether the ABE also improves memory when the target detection task is implemented at the time of retrieval. Participants encoded words under full attention (FA) then took a recognition test under either FA (no concurrent task) or divided attention (DA) conditions, the latter of which involved a concurrent task in which participants responded to targets and rejected distractors that were co-presented with each recognition test item. Targets and distractors had no effect on recognition in the FA condition but, in the DA condition, target detection increased false alarms for words relative to distractor rejection. This false memory effect did not differ when the materials in the concurrent task mismatched (numbers) or matched (words) the recognition test materials. Target detection therefore enhances memory under DA encoding but creates a memory illusion under DA retrieval.

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6:00-7:30 PM (5179)

Impact of Cross-Modal Information Format and Semantics on Visual Object Recognition. ASHLEY S. BANGERT, University of Texas, El Paso, HAYDEN WHITE, University of Texas, El Paso - People integrate information from multiple sensory modalities when recognizing objects in the environment. We investigated how: a) analog (e.g. images/naturalistic sounds) and b) symbolic (e.g. written/spoken words) cross-modal information impacts visual object recognition. We analyzed participants' mouse trajectories as they classified natural or man-made visual targets while processing concurrent auditory information. Information format across modalities either matched or mismatched and semantic congruency of this information was manipulated. There was no impact of concurrent information format on recognition. However, participants had more difficulty classifying written word versus image targets. Identification of written words was impacted more than images by the presence of semantically incongruent auditory information. Thus, when people classify visual objects, target information type plays a large role in recognition performance while concurrent information type from the auditory modality has little impact. However, recognition of symbolic visual targets likely requires additional processing steps, leaving more time for them to be disrupted by the semantics of concurrent auditory information than analog targets.

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6:00-7:30 PM (5180)

An Illustrative Exception to a Materials-Based Bias Difference in Recognition Memory. KAITLYN FALLOW and D. STEPHEN LINDSAY, University of Victoria (Sponsored by D. Stephen Lindsay) - We have consistently observed a pattern of materials-based response bias differences in recognition memory studies using words (moderate- to high-frequency nouns) and complex pictures (paintings, faces, or assorted scenes) as stimuli, most prominently a tendency for bias for pictures to be both significantly conservative and significantly more conservative than bias for words. Although this pattern has proven robust to some variation in procedure and stimulus set, its boundary conditions remain unclear. As a step toward addressing this, we used Snodgrass and Vanderwart's simpler, more directly comparable picture and word stimuli (i.e., line drawings and corresponding labels) in a recognition memory experiment that was otherwise methodologically similar to our previous studies. Manipulating materials type within subjects, we replicated the picture superiority effects commonly observed with Snodgrass and Vanderwart's stimuli in hit rates, false alarm rates, and sensitivity (d'), but response bias (c) was neutral and statistically equivalent for pictures and words. Email: Kaitlyn Fallow, kmfallow@protonmail.com

6:00-7:30 PM (5181)

Delta Plot Analysis of Recognition Memory Data. RYAN ANDREW CURL, Syracuse University, COREY N. WHITE, Missouri Western State University, AMY H. CRISS, Syracuse University (Sponsored by Corey White) - It is well established that analysis of response time distributions and accuracy improves understanding of yes/no recognition memory. Sequential sampling models have provided a valuable method of measuring parameters associated with cognitive processing based on RT and accuracy. However, most implementations of these models provide static values for the parameters. For example, the diffusion model provides a static value for bias one that does not describe how bias unfolds over the course of the decision. To better understand how different types of information are evaluated over the course of the decision, we turn to the delta plot analysis technique. We present a delta plot analysis of several recognition memory data sets and consider how they might inform models of recognition memory. Email: Ryan Andrew Curl, rcurl@syr.edu

6:00-7:30 PM (5182)

Recognition Memory Is Fundamentally Continuous, and Strategic Discretization Does Not Change This. RYAN M. MCADOO, *University of Oklahoma & Syracuse University*, SCOTT D. GRONLUND, *University of Oklahoma* (Sponsored by Scott Gronlund) – Recognition memory research has long focused on whether it is mediated by discrete orcontinuous processes. Recent research has shown that the picture is more complex. Recognitionmemory is not continuous or discrete, but may be treated as either, depending on a confluence of internal and external factors. This strategic discretization assumes that the memory signal available to the decision makers is fundamentally continuous, but this has not been empirically supported. Experiment 1 tested this assumption and found that recognition memory is fundamentally continuous. Experiment 2 was whether strategic designed test discretization to signal from changes this continuous discrete to and found that it did not. The results of these studies further solidify the understanding of how recognition memory is mediated, and also suggests future directions for answering important, applied questions.

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6:00-7:30 PM (5183)

Is a Conservative Recognition Decision Bias More Effortful than a Liberal One? LUNA J. LI and CASSIE GREENWALD, California State University, Northridge, D. STEPHEN LINDSAY, University of Victoria, JUSTIN KANTNER, California State University, Northridge - In recognition memory, individuals can exhibit a strong conservative response bias (much higher miss than false alarm rate), a strong liberal bias (much higher false alarm than miss rate), or any level in between. A conservative bias is often referred to as "cautious" or "strict," a characterization based on the assumption that conservative recognizers possess a higher standard of evidence for calling an item "old" than liberal recognizers. We present data suggesting that conservative bias is not more effortful than liberal. Specifically: 1) dividing attention at test did not liberalize participants' response bias; 2) participants tended to be less liberal when a liberal response bias was adaptive than they were conservative when a conservative bias was adaptive; and 3) conservative recognizers did not take longer to make recognition decisions than liberal recognizers. The implications of these findings for the characterization of liberal and conservative response biases will be discussed. Email: Justin Kantner, justin.kantner@csun.edu

6:00-7:30 PM (5184)

Limitations to Context Reinstatement: Familiarity with Faces Reduces Effect. CHRISTOPHER LEE and MYRA A. FERNANDES, University of Waterloo - The context reinstatement (CR) effect suggests recognition of a target item is enhanced when its retrieval context matches that from encoding (see Smith & Vela, 2001 for review). However, experience tells us that there are certain stimuli, such as faces, that are easily recognized regardless of context. Here we examined the role of target familiarity, and type, on the CR effect. We manipulated familiarity with a set of to-be-remembered faces (experiment 1), words (experiment 2), or objects (experiment 3) such that targets were presented 0, 1, 3, or 10 times in a pre-exposure phase. Subsequently, targets were paired with various context scenes in an encoding phase. A recognition test was then administered in which targets, intermixed amongst foils, were paired with either reinstated or novel contexts. As face familiarity increased, the magnitude of the CR effect was diminished, and was significantly smaller for faces pre-exposed 10 times compared to 0 times. In contrast, CR effects for words and objects remained significant and of consistent magnitude,

regardless of target familiarity. Results suggest that the benefit of reinstating context, on target memory, depends on 1) the familiarity and 2) the type of target being remembered. Email: Christopher Lee, christopher.lee@uwaterloo.ca

6:00-7:30 PM (5185)

Effects of Recollect/Familiar Task Options on the Picture Superiority Effect. JAMIE ADAMS, Keele University, GLEN BODNER, Flinders University, HELEN L. WILLIAMS, Keele University (Sponsored by Glen Bodner) - Stimuli presented as pictures are markedly better recognized than those presented as words. This picture superiority effect (PSE) usually reflects increases in recollection, rather than familiarity. In recent work, we explored whether the effect of levels-of-processing on recollection and/or familiarity was influenced by whether the response options provided during the recognition test were: 1) mutually exclusive Recollect/Familiar/Guess judgments; 2) non-mutually exclusive Recollect/Familiar/Both/Guess judgments; or 3) independent Recollect and Familiar ratings. Here, we explored the same question for the PSE: is subjective recollection consistently pronounced for pictures (rather than words) regardless of the particular response options available to participants? Our findings suggest that the method used to measure subjective recollection/familiarity memory states can affect the conclusions drawn about the process(es) that underlie encoding effects, particularly when comparisons are made across studies that utilize different stimuli formats. Email: Jamie Adams, j.adams@keele.ac.uk

6:00-7:30 PM (5186)

Forget Me Not: Are Stronger Memories More Susceptible to Retrieval-Induced Forgetting? LAURA L. HEISICK, Louisiana State University (Sponsored by Megan Papesh) -Retrieving information sometimes causes forgetting of related, but unpracticed, information, termed retrieval-induced forgetting (RIF). The inhibition account of RIF suggests related but unpracticed information is inhibited during retrieval, resulting in forgetting. Critically, this account predicts stronger memories are more susceptible to RIF because they produce greater competition when unpracticed. Two experiments aimed to replicate recent work suggesting memorable objects and faces are more likely to be forgotten. In Experiment 1, participants studied and practiced typical and non-typical objects, and in Experiment 2, participants studied and practiced own- and other-race faces. Experiment 1 showed memorability influenced the magnitude of RIF: Non-typical (i.e., highly memorable) objects were more likely to be forgotten than typical (i.e., nonmemorable) objects. Experiment 2 revealed no RIF for own- or other-race faces. These findings suggest that if memory traces are too weak to produce competition, no RIF is observed, and provide support to inhibitory accounts of RIF. Email: Laura L. Heisick, lheisick@gmail.com

6:00-7:30 PM (5187)

Behavioral Pattern Separation is Determined by Familiarity Decision. AGNES SZOLLOSI and MIHALY RACSMANY, *Budapest University of Technology and Economics* (Sponsored by Mihaly Racsmany) – Pattern separation refers to the process that minimizes interference between memory representations with similar features and is suggested to be associated with hippocampus-related recollection. We tested this hypothesis using the incidental Mnemonic Similarity Task, with old (target), similar (lure) and new (foil) items, which is widely used for detecting individual differences in pattern separation performance. In Experiment 1, participants made old/similar/ new decisions and rated decision confidence. In Experiment 2, participants gave a recognition confidence judgment (1: sure new, 6: sure old). Confidence ratings were higher for targets compared to lures when we analysed correct responses in Experiment 1. Additionally, we found a symmetrical ROC curve for target-lure discrimination in Experiment 2. These results suggest that familiarity, rather than recollection, contributed to behavioural pattern separation. We discuss our results in light of the single- and dual-process models of recognition memory. Email: Agnes Szollosi, aszollosi@cogsci.bme.hu

6:00-7:30 PM (5188)

Strength Effects in Source Recognition Memory. SINEM AYTAÇ and ASLI KILIÇ, Middle East Technical University (Sponsored by Asli Kilic) - The present study was conducted to explore the list-strength paradigm in source memory. In the study, strong sources in which items are repeated three times and weak sources in which items are presented only once - but two more in two other contexts were studied either in pure or mixed lists. Then, participants were tested with a list containing source targets and source foils. When sources were strengthened in pure lists, hit rates increased and false alarm rates decreased compared to weakly encoded sources - a phenomenon known as the strength-based mirror effect (SBME). When mixed-list strength was implemented, memory performance of weak sources was not damaged because of the presence of strong sources in the list. Similarly, memory performance of strong sources did not increase due to weak sources in the same list. This is known as the null list-strength effect (LSE). These results provided an extension of the SBME and the null LSE to source memory and were discussed in the light of both the diffentiation account and the criterion shift account.

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6:00-7:30 PM (5189)

Differential Feature Weighting in Word Familiarity: Implications for Formal Models of Familiarity. ANDREW M. HUEBERT and ANNE M. CLEARY, Colorado State University (Sponsored by Anne Cleary) - Models of familiarity generally assume that familiarity results from the amount of overlap between the features in memory and those in a test probe. In these models, features are weighted equally in the computation of familiarity. We investigated if different features are weighted differently in the computation of familiarity signals. Drawing from psycholinguistics, we hypothesized that the first and last letter are weighted more heavily in computing word familiarity than middle letters. In a variant of the Recognition Without Identification paradigm, participants studied word fragments (RA_ _ _ OP) then at test rated the familiarity of complete words (RAINDROP). Among studied fragments, we varied whether the first and last or middle letters were present. Test B

words whose studied fragments contained the first and last letters felt more familiar than those whose fragments contained inner letters. In Experiment 2, letters adjacent to other letters $(RA___OP vs R_I_R_P)$ led to stronger familiarity signals than separated letters. The results suggest that different features are weighted differently in the computation of familiarity signals, and also combine differently with each other. Email: Andrew M. Huebert, andrew.huebert@colostate.edu

6:00-7:30 PM (5190)

Modeling Joint Speed and Choice Distributions from Repeated Recognition Memory Tests. WILLIAM J. HOPPER and JEFFREY J. STARNS, University of Massachusetts, Amherst (Sponsored by Jeffrey Starns) - Recently, discrete state models of recognition memory decisions have been extended to account for response times by assuming observed RTs arise from a mixture of latent response time distributions associated with each evidence state (Heck & Erdfelder, 2016, Starns, 2018). These newer models have not yet been compared with existing models of choice and response time. Here, we compare the discrete-race model to the Ratcliff diffusion model in a three-step recognition task in which participants (1) made a speeded "studied"/"nonstudied" response; (2) saw a biasing cue indicating whether the a priori probability of "studied" was 25%, 50%, or 75%; and (3) responded a second time to the same word. Each model was tested in terms of its ability to account for accuracy and RTs in the speeded decision, to account for response proportions across biasing conditions for the unspeeded decision, and the relationship between the two. This comparison sheds light on the psychological processes of recognition memory because the models explain response switches with different mechanisms (initial guesses vs. misleading evidence), and the ability of each mechanism to explain later decisions is modulated by the speed of the initial decisions.

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6:00-7:30 PM (5191)

Using Brain Activity During Study to Predict Future Memory. SUCHETA CHAKRAVARTY, University of Alberta, YVONNE Y. CHEN, Baylor College of Medicine, JEREMY B. CAPLAN, University of Alberta (Sponsored by Jeremy Caplan) - To isolate brain activity that reflects effective processes during the study phase of a memory task, cognitive neuroscientists commonly contrast brain activity of later-remembered versus forgotten items. This, "subsequent memory effect" method is described as identifying brain activity "predictive" of memory outcome. However, decades of behavioural research suggests that memory success depends not only on cognitive processes during study of an item, but on many processes that occur at other times (e.g., competition from other studied items, study-test compatibility, etc.). First, we tested whether classic event-related potentials were, in fact, predictive of later old/ new recognition memory but they were not. Next, pattern classification of the multivariate spatio-temporal features of the ERP waveform during study succeeded in predicting memory above chance. However, as anticipated, prediction was small in magnitude. These findings suggest that the term "predictive" is an inappropriate description of the standard subsequent memory effect. For study-related brain activity to be more predictive, it may require integrating other factors known to influence memory, with standard univariate, as well as classifierbased approaches.

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6:00-7:30 PM (5192)

Chunking in Complex Cognitive Tasks. KRZYSZTOF PIĄTKOWSKI, Adam Mickiewicz University in Poznań, KATARZYNA ZAWADZKA and MACIEJ HANCZAKOWSKI, SWPS University (Sponsored by Maciej Hanczakowski) -Chunking is a process of creating novel long-term memory representations that benefit working memory by reducing the amount of information that needs to be stored and processed. The present study investigated how chunks are established in a complex task that involves remembering short letter strings in service of performing a variety of perceptual and semantic decisions denoted by individual letters. The effectiveness of chunking was assessed both with a concurrent load task - asking participants to remember additional items while performing the focal task - and by comparing performance in the focal task for novel and previously trained strings. Chunked strings were found to facilitate performance in the focal task but not memory for concurrently held memoranda.

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6:00-7:30 PM (5193)

Sequential Encoding in Long-Term Memory Improves Visual Short-Term Memory. YOSHIYUKI UEDA, Kyoto University, TSUNG-REN HUANG, ZIXIN SHEN, and SU-LING YEH, National Taiwan University, SATORU SAITO, Kyoto University - Repeated presentation of items (or regularity) facilitates acquisition of long-term knowledge, which is utilized for efficient processing hereafter. However, to improve visual short-term memory, each item should be sequentially attended when it is encoded (Ueda et al., 2019 ESCoP). This study investigated the effect of sequential congruency across encoding and retrieval. Four color patches at different locations were presented sequentially and participants were asked to encode them. After a 2-sec interval, half recalled the color in the same order as encoded, and the other half recalled in an incongruent order. Recall performances were higher for trials in which the same arrangement repeatedly presented, and colors highly associated with certain locations than those in which colors did not associate with locations regardless of recall order. This suggests that sequential encoding in long-term memory is important to improve short-term memory regardless of sequential congruency across the encoding and recall. Email: Yoshiyuki Ueda, ueda.yoshiyuki.3e@kyoto-u.jp

6:00-7:30 PM (5194)

The Influence of the Number of Part-Set Cues on Order Retention. MATTHEW R. KELLEY, ZOE WALTS, YESENIA URIBE, ESTELLA TCATURIAN, MADISON STREJC, ANNE KELLER, and LESLIE GONZALEZ, *Lake Forest College* (Presented by Matthew Kelley) – In Slamecka's (1968) original part-set cueing experiments, he examined the influence of the number of part-set cues on "free" recall performance. Generally, he reported that the magnitude of part-set cueing *impairment* increased as the number of part-set cues increased, with the strongest impairment occurring when 29 of the 30 items were given as cues. The present study explored the influence of number of part-set cues on a reconstruction of order task, which typically shows part-set cueing *facilitation* when the cues are placed in their correct serial positions. In contrast to the "free" recall results, part-set cueing facilitation tended to increase as the number of part-set cues increased. Implications will be discussed.

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6:00-7:30 PM (5195)

"Memory Compression" Effects in Visual Working Memory are Contingent on Explicit Long-Term Memory. WILLIAM NGIAM, University of Chicago, JAMES BRISSENDEN, Boston University, EDWARD AWH, University of Chicago - Given robust associations between working memory (WM) capacity and broad measures of cognitive ability, there is strong interest in factors that can improve WM performance. In one such example, Brady, Konkle and Alvarez (2009) reported improved color recall when specific pairs of colors were highly likely to co-occur. They proposed that statistical learning enabled WM representations to be "compressed", thereby expanding the number of items that could be concurrently stored in working memory. In the present work, we replicated the empirical pattern reported by Brady et al., but we also observed that the benefits of the imposed regularities were only observed in subjects who subsequently showed perfect long-term memory for the color pairs. Thus, improved performance in this procedure can be fully explained by a collaboration between visual WM and long-term memories of the color pairs, without any change in the number of representation maintained in working memory. Email: William Ngiam, wngiam@uchicago.edu

6:00-7:30 PM (5196)

Do I Remember It or Am I Guessing? - The Role of Task Difficulty for Metacognitive Judgements in Visual Working Memory. JULIA KRASNOFF, KLAUS OBERAUER Q, and HENRIK SINGMANN, University of Zurich (Sponsored by Klaus Oberauer) - In a current quantitative model of Visual Working Memory (VWM) Confidence (van den Berg et al., 2017, Psychological Review), memory precision is directly mapped to confidence ratings through Fechner's law. In contrast, studies on Long Term Memory found that task difficulty influences the relation between memory performance and metacognitive judgements. We replicated the latter finding in a VWM color reproduction task using set size to operationalize task difficulty and asking participants to indicate whether they are guessing. Despite reporting "guessing", participants' Mean Absolut Deviation (MAD) was small (their answers were quite accurate) at set size 2 and increased with increasing set size (i.e. the MAD was about twice as large in set size 8 compared to set size 2). Thus, whether a response is said to be a guess does not only depend on its accuracy but also on task difficulty. A preregistered follow-up study investigates whether it is only the threshold for remembering vs. guessing that shifts with task difficulty, or whether people provide different confidence ratings on a continuous scale while showing the same MAD dependent on set size. We test whether the data from both studies can be fit by the VWM Confidence model. Email: Julia Krasnoff, j.krasnoff@psychologie.uzh.ch

6:00-7:30 PM (5197)

Self-Initiated Spatial Working Memory in Children 7-10 Years Old. HAGIT MAGEN, The Hebrew University of Jerusalem, NETA HAI-EZRA and TAMAR KOOR, The Hebrew University of Jerusalem (Presented by Hagit Magen) -Numerous studies have examined the development of spatial working memory (WM), yet these studies focused almost exclusively on memory tasks in which children had no control over the content of the memory representations. In contrast, in everyday life, children as adults, often shape the content of their memory representations themselves. In this study, we explored the development of this aspect of memory, termed self-initiated (SI) WM, in the spatial domain. A modified spatial span task was used, in which children aged 7-10 years old and young adults memorized spatial sequences they constructed themselves, or random sequences provided to them. Similar to adults, all children constructed structured efficient spatial sequences. Accuracy was lower in children across all conditions, but they nevertheless benefited from self-initiation to the same extent as adults. Overall, when given control over encoding, children in middle to late childhood demonstrate metacognitive knowledge on the structure of efficient memory representations, knowledge they utilize to construct efficient spatial WM representations that benefit their performance.

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6:00-7:30 PM (5198)

Sustained ERPs Reflect Information About Face Identities and Facial Expressions Held in Working Memory. GI-YEUL BAE and STEVEN J. LUCK, University of California, Davis -Previous studies have shown that the ERP scalp topography contains information about simple visual features held in working memory (WM). Here, we attempted to decode complex objects-face identities and facial expressions-from ERP scalp topographies. Participants performed a working memory task that required independent judgments of identity and expression. We found that face identities, facial expressions, and their combination were decodable throughout most of the retention interval. Confusion matrix analysis confirmed that this was not driven by a subset of face images. We also found good generalization: the identity of a specific identityexpression combination could be decoded even though the classifier had never been trained with that expression, and the expression could be decoded without training the classifier on that identity. Together, these results demonstrate that the maintenance of complex visual objects is accompanied by sustained neural activity that contains information about the specific item being maintained.

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6:00-7:30 PM (5199)

A Common Serial Order Mechanism for Verbal Working Memory and Language Production: Evidence from Aphasia. YINGXUE TIAN, Rice University, HEATHER DIAL, University of Texas, Austin, RANDI C. MARTIN and SIMON J. FISCHER-BAUM, Rice University (Sponsored by Simon Fischer-Baum) - The capacity for remembering serial order information is important to many cognitive functions and has been shown to dissociate from item-identity processing in verbal working memory (WM). Using a multiple-case approach, we investigated if there is a single serial order working memory (SOWM) capacity involved in verbal and nonverbal WM, and if there is a common order processing capacity shared between verbal WM and language production. Three chronic aphasic patients (M.B., E.V., and S.H.) were tested on verbal and nonverbal SOWM (serial reconstruction, item probe, order probe) and language production (repetition, spelling) for associated/dissociated serial order impairments. M.B. exhibits order impairment in verbal WM and language production, but not in nonverbal WM, whereas E.V. and S.H. show no order impairments in the three domains. The results suggest a common mechanism for serial order between verbal WM and the language production distinct from the serial order mechanism used in nonverbal WM.

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6:00-7:30 PM (5200)

Investigating the Relationship Between Cognitive Offloading and Working Memory Capacity: A Replication and Extension of Risko & Dunn, 2015. ALEXANDRA B. MORRISON, California State University, Sacramento, LAUREN L. RICHMOND, NICOLE DUFFY, and RACHEL HATCHER, Stony Brook University, SARA THORNTON, California State University, Sacramento - Cognitive offloading, the act of relying on an external means of 'remembering' rather than one's internal memory store, is pervasive in everyday life. Recent work by Risko & Dunn (2015) showed that participants performed better on a short-term memory test for letter strings when they were able to engage in offloading (hereafter referred to as the offloading block) compared to relying on their memory abilities (hereafter referred to as the no offloading block), and that those participants with lower objective memory performance chose to offload information more than those with better memories when given the opportunity to do so. Here, we replicate and extend the findings of Risko & Dunn (2015) by including multiple measures of working memory capacity and increasing the sample size (n = 114) to be suitably powered for individual differences analyses. In this dataset, we replicate the performance advantage for offloading originally reported in Risko & Dunn (2015). We do not observe a significant correlation between performance in the no offloading block and frequency of offloading in the offloading block, a point of departure from Risko & Dunn (2015). The role of WMC in both performance and offloading choice will also be discussed. Email: Alexandra B. Morrison, alexandra.morrison@csus.edu

6:00-7:30 PM (5201)

A Study of Compression in Working Memory Using a Large Data Set Gathered from an Exhibit Devoted to Memory in a Scientific Museum. FABIEN MATHY, Université Côte d'Azur, NICOLAS GAUVRIT, Université d'Artois - Working memory capacity is usually studied using non-recodable sequences of items guaranteeing that the highest number of items that can be immediately recalled estimates the span reliably. It has been shown that capacity limit in such conditions is quite low: 4 items in working memory when recoding is hardly possible; 7 items in short-term memory when a few opportunities for recoding are present. One question is how a highly recodable material can extend capacity limits. We analyzed a data set composed of 32000 trials gathered in a scientific museum in which there was an exhibit devoted to memory. We estimated the compressibility of each of the to-be-recalled 12-item sequences of colors to predict performance. Immediate recall was well predicted by our compressibility metric. Recall was however on average more compressible than the stimulus. Since random errors should have generated a response less compressible than the stimulus, we discuss the idea that working memory commits errors typical of over-compression when facing difficulty. Email: Fabien Mathy, fabien.mathy@univ-cotedazur.fr

6:00-7:30 PM (5202)

Tongue Twisters and the Phonological Loop. KATHERINE M. MATHIS and CHRISTIAN W. WELCH, Bates College - People have more difficultly recalling words that are phonologically similar compared to a control list of dissimilar words. This result, known as the phonological similarity effect, suggests that when participants are attempting to recall auditorily or visually presented stimuli, they subvocally rehearse the words in the phonological loop. The current study examined the phonological similarity effect by testing the accuracy of memory recall on lists of phonologically similar non-rhyming words (tongue twister condition), phonologically similar rhyming words (rhyme condition), and phonologically different non-rhyming control words (control condition). Even though the lists in the tongue twister condition had less phonological overlap than the rhyme condition, participants had significantly lower serial recall in the tongue twister condition compared to both rhyme and control conditions, which did not differ from each other. Implications for Baddeley's working memory model are discussed (Baddeley & Hitch, 1974; Baddeley, 2010). Email: Katherine M. Mathis, kmathis@bates.edu

6:00-7:30 PM (5203)

Role of Refreshing and Consolidation in Working and Long-Term Memory. MAXIMILIEN LABARONNE and GAEN SARAH PLANCHER, *University of Lyon* (Sponsored by Gaen Plancher) – Consolidation and refreshing opportunities were orthogonally manipulated in working memory to assess their impact on memory performance of words and pseudowords at various delays, including after a night of sleep. Our results showed that, contrary to words, pseudowords were not affected by the cognitive load of the concurrent task at immediate recall, suggesting that pseudowords cannot be maintained by refreshing. In addition, contrary to previous findings, refreshing opportunities did not impact delayed recall of words, neither of pseudowords. However, providing free time for consolidation after encoding gave better memory performance for words and pseudowords at immediate and delayed recalls. Consolidation did not interact with refreshing suggesting that consolidation, even if beneficial for memory, was not enough to make refreshing of pseudowords possible. Taken together, these results provide evidence in favor of a dissociation between refreshing and consolidation and give new insight on how semantic memory contributes to working memory recall. Email: Gaen Sarah Plancher, gaen.plancher@univ-lyon2.fr

6:00-7:30 PM (5204)

Effect of Varying Memory Load in Working Memory on Associative Long-Term Memory. LEA M. BARTSCH and KLAUS OBERAUER Q, University of Zurich – The goal of the present study was to investigate the importance of establishing and holding bindings in working memory (WM) to retention of those bindings in long-term memory (LTM). During a WM task, subjects were to remember arbitrary word pairs (e.g., dog - tooth) at varying set sizes and were tested immediately with a three-alternative forced choice procedure. LTM for the pairs was later assessed with the same method, allowing us to obtain separate measures of item and binding memory for both memory systems. If interference between the word pairs in WM causes them to be represented less precisely or less robustly, this should lead to impaired LTM representations. Accordingly, increasing the number of word pairs (i.e., set size) in WM should have a corresponding detrimental effect on LTM. Set size had the usual detrimental effect on WM for bindings but had no such effect on LTM. We conclude that the quality of representations in WM does not influence how well the same information is remembered in the long term.

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6:00-7:30 PM (5205)

Working Memory Consolidation Improves Long-Term Memory Recognition in Words and Non-Words. KELLY COTTON and TIMOTHY J. RICKER, City University of New York (Sponsored by Timothy Ricker) - Many traditional memory models incorporate both working and long-term memory, though the exact nature of the relationship remains contested. The present research aims to explore the role of working memory consolidation on long-term recognition. Participants completed two tasks: a stimuli-identification task and a surprise long-term recognition task. Participants first identified which one of four words/non-words matched a target word/non-word. The target item was presented either just before the response set or simultaneously with the response set. This manipulation requires that the participant consolidate the target into working memory during the before condition but not during the simultaneous condition. Long-term memory recognition for the search targets was then tested. There was a slight performance advantage in the simultaneous condition during the stimuli identification task, but later recognition performance was significantly better for target

items presented in the before condition. These results suggest that consolidation into working memory improves long-term memory performance.

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6:00-7:30 PM (5206)

Organization in Working Memory is Driven by the Compressibility of Information. LAURA LAZARTIGUES and FRÉDÉRIC LAVIGNE, Université Côte d'Azur, CARLOS AGUILAR, Lab by MANTU, Amaris Research Unit, FABIEN MATHY, Université Côte d'Azur (Sponsored by Frédéric Lavigne) - Working memory (WM) is known to be limited in capacity, but mechanisms based on compression of information could contribute to the storage process. It has been shown that chunking governed by compression could be one of these mechanisms. The present study investigated how chunks can be formed using patterns to be discovered on the spot, that is, without these chunks being already formed in long-term memory. We predicted that a compact representation could leave room in WM at the expense of the quality. Our method was based on a compressibility metric that allowed prediction of memory errors linked to a lossy compression process. Our result showed that RTs and errors depended on compressibility, and those measures might be interpretable in terms of overcompressibility. We discuss the results to conclude that the present study offers a comprehension of WM capacity which cannot be accounted easily by shared-allocation models or discrete-slots models.

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6:00-7:30 PM (5207)

Multisensory Facilitation of Working Memory Training and Transfer. ANJA PAHOR, TREVOR STAVROPOULOS, and CINDY COLLINS, University of California, Riverside, AUSTIN MOON and SUSANNE M. JAEGGI, University of California, Irvine, AARON SEITZ, University of California, Riverside -Exposure to stimuli presented in multiple sensory domains can facilitate learning and memory; however, multisensory facilitation of working memory (WM) training has not been systematically investigated. To address this, we conducted a WM training study in which healthy adults were randomly assigned to 1 of 4 conditions: Alternating visual/auditory (N = 17), Visual only (N = 19), Multisensory (N = 18), or Passive control (N = 30). The 3 active groups trained for 12 days (up to 40 min per day) on an adaptive N-back task and all groups completed a battery of pre- and post-tests. The Multisensory group showed the largest gains on the training task and, unlike the other groups, showed transfer to complex WM tasks. No clear group differences emerged for far transfer. These results suggest that training with a multisensory protocol facilitates learning and leads to near transfer compared to unisensory training.

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6:00-7:30 PM (5208)

Affective Modulation of Working Memory Maintenance. AHU GOKCE, *Kadir Has University*, ARTYOM ZINCHENKO, EFSUN ANNAC, MARKUS CONCI, and THOMAS GEYER, Ludwig-Maximilian-Universität München - The interplay between attentional mechanisms and emotions has been widely investigated, but less work has addressed the role of emotions during spatial working memory (WM) performance. This study investigated, how WM is affected by emotional information presented during the retention of spatial information. Participants performed a delayed matching-to-sample task, that required maintaining the spatial locations of four squares during a short retention interval, until a probe item was presented. The task was to report whether the probe item's location matched with any of the memorized square positions. In two experiments, emotional task-irrelevant positive, neutral and negative images were presented during the retention interval. Sensitivity, as measured with d', revealed valence-specific effects particularly for negative emotions during WM maintenance: compared to neutral images, negative images impaired WM while positive pictures had no effect on performance. This finding may be taken to suggest that negative emotions reduce the ability to filter irrelevant information during the retention period, thereby reducing WM maintenance. Email: Ahu Gokce, ahu.gokce@khas.edu.tr

6:00-7:30 PM (5209)

Effects of Trial Distinctiveness on Individual Differences in Visuospatial Working Memory. LINDSEY LILIENTHAL, Penn State Altoona - Proactive interference (PI) has been shown to increase across trials of tasks measuring working memory (WM), which has a negative impact on memory performance, particularly for participants with low WM spans. Importantly, PI seems to be maximized when to-be-remembered items are similar to one another, and it can be reduced when items are made more distinct. The two experiments of the present study investigated the impact of increasing the distinctiveness of items across trials on individual differences in a visuospatial WM task, with the prediction that although increased distinctiveness may improve memory performance for everyone, it should benefit low-span participants more than high-span participants. In the baseline task condition, all to-be-remembered locations were presented as red circles; distinctiveness was then increased in additional conditions by changing the color of the circles on each trial, and/or by introducing unique sounds on each trial. In both experiments, the prediction was supported: at the group level, memory was significantly better when the distinctiveness of to-be-remembered locations was increased across trials, but critically, low spans benefited significantly more than high spans.

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6:00-7:30 PM (5210)

Changes in Prefrontal Brain Activity Associated with Order Information Memory. KATSUKI HIGO and NAOKO OKAMOTO, *Ritsumeikan University*, MARIKO OSAKA, *NICT* – The memory of order and position information is important in daily-life activities, for example, recalling the route to a destination. In this study, we compared the changes in brain activity associated with the order information memory of spatial position. We used the spatial tapping task for experiments and provided the forward and backward conditions (where the order had to be memorized), and simultaneous presentation condition (without the need to memorize the order). In this experiment, we measured the brain function using functional near-infrared spectroscopy. The difference between the forward and backward conditions in the encoding process was demonstrated in the behavioral data of the previous study. Therefore, the executive function in order memory can be investigated by comparing the difference in the prefrontal activity observed in the forward and backward conditions. As a result, there was no significant difference in the brain activity between each condition, indicating two possibilities. First, the executive function is not so important in the order memory of spatial position; second, the function of the parietal lobe, and not the prefrontal brain, is important among the executive functions.

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