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Visuo-Vestibular and Cardiovascular Contributions to Vertical Ego-motion Representation

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Published: 21/11/2017

Document Version:
Publisher's PDF, also known as Version of record

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Recommended citation(APA):
Giannopulu, I. (2017). *Visuo-Vestibular and Cardiovascular Contributions to Vertical Ego-motion Representation*. Science of the Self, Sydney, Australia.

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ICCS 2017

The 11th International Conference on Cognitive Science

September 1 ▸ 3, 2017

GIS NTU Convention Center, Taipei, Taiwan

Program

Organizers

國立中正大學
National Chung Cheng University

Center for Research in Cognitive Science

Co-Organizers

臺灣認知神經科學學會 Taiwan Society of Cognitive Neuroscience

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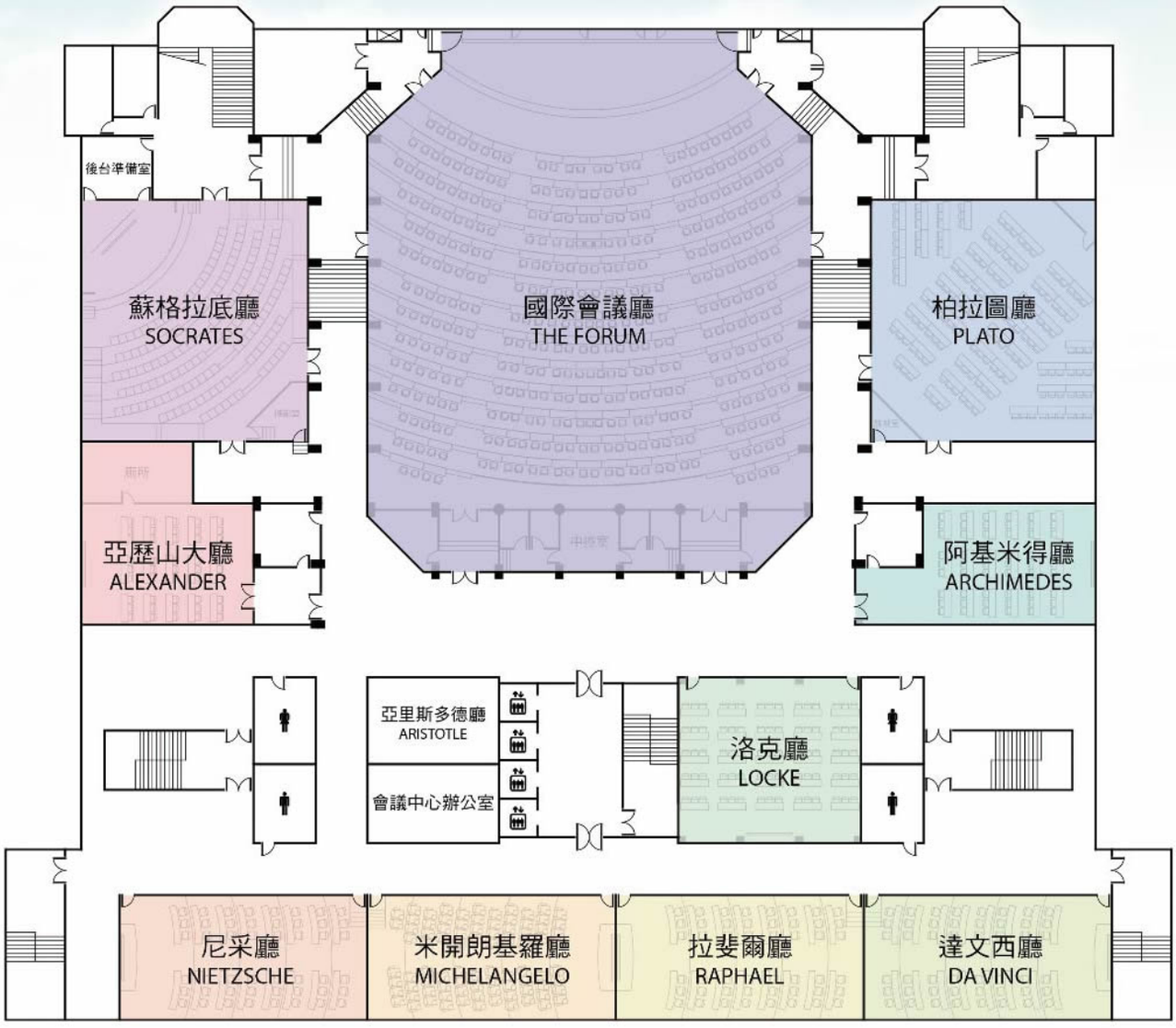
NTU GIS Convention Center Map

集思台大會議中心場地平面圖



The 11th International Conference on Cognitive Science (ICCS 2017)

September 1-3, 2017

Taipei, Taiwan

PROGRAM

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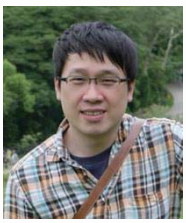

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National Yang-Ming University, Taipei, Taiwan

Su-Ling Yeh

National Taiwan University, Taipei, Taiwan

PRESIDENT'S WELCOME

On behalf of the Organizing Committee, I would like to welcome you all to the 11th International Conference on Cognitive Science (ICCS 2017)!

For more than a quarter of century, Cognitive Science has been growing and thriving in Taiwan, beginning with the establishment of Center for Research in Cognitive Science in 1990 by Ovid Tzeng at the National Chung Cheng University in Chiayi, Taiwan. Following that lead, we have witnessed the rapid growth of cognitive science on many other campuses in Taiwan where similar institutions and programs are set up, including the Cognitive and Neurobiological Research Center of National Taiwan University, Research Center for Mind, Brain, and Learning of National Cheng Chi University, Graduate Institute of Cognitive Neuroscience of National Central University, Graduate Institute of Cognitive and Neuroscience of China Medical University, and Graduate Institute of Cognitive Science of National Cheng Kung University. Many of these research centers and graduate institutes have received broad-based funding under the auspices of *Aim for Top Universities Project* administered by the Ministry of Education (MOE) of Taiwan in recent years. Moreover, starting in 2009, the Ministry of Science and Technology (MOST) (formerly National Science Council, NSC) has decided to allocate public funding to support the installment of three research-only functional magnetic resonance imaging (fMRI) facilities as an act to firmly recognize the now burgeoning integration between cognitive science and neuroscience. National Taiwan University, National Cheng Chi University and National Cheng Kung University were the chosen sites for setting up fMRI/MEG research center. Most importantly these government-funded sites are open to all researchers who are interested in and intrigued by the fascinating and complex interactions between mind and brain to further promote the quality of research and education in cognitive science and cognitive neuroscience.

My colleagues and I are deeply honored and humbled by the opportunity to host this great and exciting event of ICCS 2017. We are delighted to inform you that we have a lineup of worldly renowned scholars to deliver keynote addresses, including Patricia Churchland from the US, Stanislas Dehaene from France, Chih-Jen Lin from Taiwan, and Ernst Pöppel from Germany. In addition, we have received and accepted more than 200 submitted presentations to be delivered across nine invited and self-initiated symposia, six talk sessions and four poster sessions throughout the next three days of the conference.

Besides the rich and diverse academic programs, we have arranged an excursion to visit the National Palace Museum (NPM) which prides herself for hosting the largest Chinese arts and art crafts in the world, followed by the conference banquet at the Silks Palace Restaurant next to the NPM. We sincerely would like to invite you all to join us for the visual and real feasts.

Once again, welcome to ICCS2017! My colleagues and I hope you will have a most enjoyable experience and fruitful stay in Taipei, Taiwan!

Gary C.-W. Shyi, President of IACS and
Chair of Organizing Committee, ICCS 2017

MEETING SCHEDULE:

ICCS 2017

FRIDAY, SEPTEMBER 1

09:00 am - 05:00 pm	Registration	Lobby
10:00 am - 10:30 am	Opening Ceremony	The Forum
10:30 am - 12:00 pm	Keynote Address 1 - Patricia Churchland	The Forum
12:00 pm - 01:30 pm	Lunch Break	
01:30 pm - 03:00 pm	Symposium 1-1	Locke
	Symposium 1-2	Alexander
	Talk Session 1-1	Archimedes
01:30 pm - 05:00 pm	Poster Session 1-1	Plato
03:00 pm - 03:30 pm	Coffee/Tea Break	Lobby
03:30 pm - 05:00 pm	Keynote Address 2 - Stanislas Dehaene	The Forum
05:00 pm - 07:00 pm	Welcome Reception	Lobby

SATURDAY, SEPTEMBER 2

08:30 am - 04:00 pm	Registration	Lobby
08:30 am - 10:00 am	Symposium 2-1	Locke
	Symposium 2-2	Alexander
	Talk Session 2-1	Archimedes
08:30 am - 12:00 pm	Poster Session 2-1	Plato
10:00 am - 10:30 am	Coffee/Tea Break	Lobby
10:30 am - 12:00 pm	Keynote Address 3 – Chih-Jen Lin	The Forum
12:00 pm - 01:00 pm	Lunch Break (IACS Steering Committee meeting)	
01:00 pm - 02:30 pm	Symposium 2-3	Locke
	Talk Session 2-2	Alexander
	Talk Session 2-3	Archimedes
	Talk Session 2-4	Michelangelo
01:00 pm - 04:30 pm	Poster Session 2-2	Plato
02:30 pm - 03:00 pm	Coffee/Tea Break	Lobby
03:00 pm - 04:30 pm	Symposium 2-4	Locke
	Symposium 2-5	Alexander
	Talk Session 2-5	Archimedes
04:30 pm - 05:30 pm	Travel to National Palace Museum	
05:30 pm - 07:00 pm	Visiting National Palace Museum	
07:00 pm - 09:00 pm	Conference Banquet – Silks Palace at National Palace Museum	

SUNDAY, SEPTEMBER 3

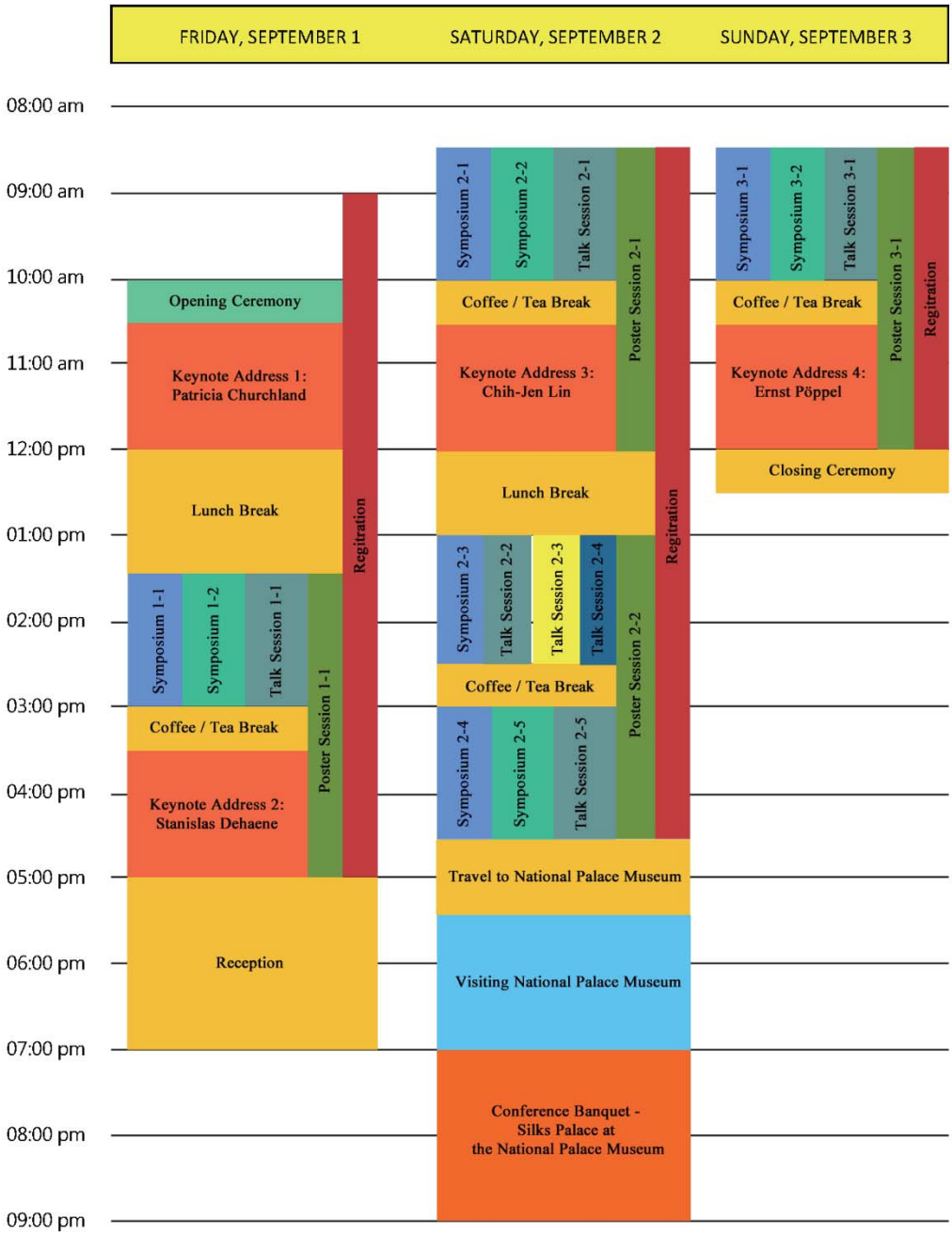
08:30 am - 12:00 pm	Registration	Lobby
08:30 am - 10:00 am	Symposium 3-1	Locke
	Symposium 3-2	Alexander
	Talk Session 3-1	Archimedes
08:30 am –12:00 pm	Poster Session 3-1	Plato
10:00 am –10:30 am	Coffee/Tea Break	Lobby
10:30 am –12:00 pm	Keynote Address 4 - Ernst Pöppel	The Forum
12:00 pm –12:20 pm	Closing Ceremony	The Forum

Cross-Strait Forum on Cognitive Science

SUNDAY, SEPTEMBER 3

08:30 am –09:00 am	Opening Ceremony	Michelangelo
09:00 am –10:30 am	Cross-Strait Forum 1-1: Face Processing	Raphael
	Cross-Strait Forum 2-1: Language: from Reading to Comprehension	Da Vinci
	Cross-Strait Forum 3-1: Sensory Processing	Michelangelo
10:30 am –12:00 pm	Keynote Address - Ernst Pöppel	The Forum
12:00 pm –01:30 pm	Lunch Break	
01:30 pm –03:00 pm	Cross-Strait Forum 1-2: Attention, Visual Cognition & Decision Making	Locke
	Cross-Strait Forum 2-2: Learning and Memory	Alexander
	Cross-Strait Forum 3-2: Brain and Mental Functions	Archimedes
	Symposium: Functional MRI in Real-Life Settings	Raphael
03:00 pm –03:30 pm	Coffee /Tea Break	Lobby
03:30 pm –05:00 pm	Cross-Strait Forum 1-3: Visual Perception	Locke
	Cross-Strait Forum 2-3: Cognitive Control	Alexander
	Cross-Strait Forum 3-3: Clinical Condition	Archimedes
05:00 pm –05:20 pm	Closing Ceremony	Locke

SCHEDULE AT A GLANCE



KEYNOTE, TALK (T) & SYMPOSIUM (S) SCHEDULE

FRIDAY, SEPTEMBER 1

TIME	TOPIC	ROOM
10:30 am – 12:00 pm	Keynote Address 1: Morality from a Neurobiological Perspective	The Forum
01:30 pm – 03:00 pm	S1-1: Consciousness and Self: Levels, Limits, and the Spontaneous Brain	Locke
	S1-2: Open Issues and Scientific Challenges for EEG/MEG Research in the Real World	Alexander
	T1-1: Cognitive Linguistics	Archimedes
03:30 pm – 05:00 pm	Keynote Address 2: The Languages of the Brain	The Forum

SATURDAY, SEPTEMBER 2

TIME	TOPIC	ROOM
08:30 am – 10:00 am	S2-1: Social Cognitive and Social Neuroscience: Insights from Animal and Human Studies	Locke
	S2-2: Acquisition and Comprehension of Linguistic Dependencies: Empirical Evidence from Lifespan Development of Sentence Processing	Alexander
	T2-1: AI, Robotics, and Philosophy	Archimedes
10:30 am – 12:00 pm	Keynote Address 3: Statistical Learning: Status and Challenges	The Forum
01:00 pm – 02:30 pm	S2-3: Perception and Media Technology	Locke
	T2-2: Language Processing	Alexander
	T2-3: Cognitive Neuroscience I	Archimedes
	T2-4: Cognitive Development	Michelangelo
03:00 pm – 04:30 pm	S2-4: Language Experience and Neuroplasticity Across Lifespan	Locke
	S2-5: Socio-Cognitive Neuroscience from Self to Culture	Alexander
	T2-5: Cognitive Neuroscience II	Archimedes

SUNDAY, SEPTEMBER 3

TIME	TOPIC	ROOM
08:30 am – 10:00 am	S3-1: Mathematical Cognition and the Brain	Locke
	S3-2: Neural Mechanisms for Context-Dependent Preferences	Alexander
	T3-1: Cognitive Psychology	Archimedes
10:30 am – 12:00 pm	Keynote Address 4: Distinction Between Cognitive Content and Operative Logistics in a Taxonomy of Functions	The Forum

POSTER SCHEDULE

POSTER SETUP AND TAKEDOWN

All poster sessions are held in **Plato** room. The last two digits of your poster number indicate the number of your poster board.

Posters should be put up at the beginning of a session and taken down at the end. Authors of Morning Poster sessions are expected to be present between 9:30 am – 10:30 am; authors of Afternoon Poster session are expected to be present between 2:30 pm – 3:30 pm.

MORNING POSTER SCHEDULE

Setup: 08:00 – 08:30 am
Take down: 12:00 – 12:30 pm
Author Present: 09:30 – 10:30 am

AFTERNOON POSTER SCHEDULE

Setup: 12:30 – 01:00 pm
Take down: 04:30 – 05:00 pm
Author Present: 02:30 – 03:30 pm

ROOM: Plato

FRIDAY, SEPTEMBER 1

01:30 pm – 05:00 pm	Cognition, Culture, Development, and Education

SATURDAY, SEPTEMBER 2

08:30 am – 12:00 pm	Cognitive Science, Cognition and Visualization, Cognitive Linguistics, Decision Making
01:00 pm – 04:30 pm	Cognitive Psychology, Consciousness, Ergonomics, Human Intelligence, Learning Technology

SUNDAY, SEPTEMBER 3

08:30 am – 12:00 pm	Cognitive Neuroscience, Cognitive Psychology, Functional Brain Imaging, & Brain, Learning, and Development

KEYNOTE ADDRESS 1

Patricia Churchland

University of California, San Diego and Salk Institute, USA

For decades, Patricia Churchland has contributed to the fields of philosophy of neuroscience, philosophy of the mind and neuroethics. Her research has centered on the interface between neuroscience and philosophy with a current focus on the association of morality and the social brain. A professor Emeritus of Philosophy at the University of California, San Diego and adjunct professor at the Salk Institute, Pat holds degrees from Oxford University, the University of Pittsburg and the University of British Columbia. She has been awarded the MacArthur Prize, The Rossi Prize for Neuroscience and the Prose Prize for Science. She has authored multiple pioneering books, her most recent being Touching a Nerve. She has served as President of the American Philosophical Association and the Society for Philosophy and Psychology.

Morality from a Neurobiological Perspective

Friday, September 1, 2017, 10:30 am. The Forum

Social neuroscience, especially in the last decade, has made impressive progress in exploring the neural mechanisms regulating social behavior, including consolation behavior, attachment and bonding, aggression, willingness to punish, and the effects of nurturing and social stress on the developing brain. In parallel, behavioral research on nonhuman mammals and birds has revealed the existence of prosocial choice, consolation behavior as well as altruistic behavior. In combination, the research raises the wider question of what these various results signify for our understanding of human social motivation in general and moral motivation in particular. Although moral philosophers have discussed norms and values since Socrates and Confucius, the scientific approach has provided new insights and provoked a reconsideration of common assumptions about the nature and origin of moral values. This seminar has five parts: (1) the evolutionary origin of sociality in mammals and birds, (2) a brief geography of moral philosophy (3) presentation of selected highlights from social neuroscience, (4) discussion of the links between the reward system and reinforcement learning of social norms and (5) what this all means for understanding moral values.

KEYNOTE ADDRESS 2

Stanislas Dehaene

INSERM-CEA Cognitive Neuroimaging Unit, France

Stanislas Dehaene is a professor at the Collège de France, author, and (since 1989) director of INSERM Unit 562, "Cognitive Neuroimaging. He has worked on a number of topics, including numerical cognition, the neural basis of reading and the neural correlates of consciousness. Dehaene was one of ten people to be awarded the James S. McDonnell Foundation Centennial Fellowship in 1999 for his work on the "Cognitive Neuroscience of Numeracy". In 2003, together with Denis Le Bihan, Dehaene was awarded the Louis D. Prize from the Institut de France. In 2014, together with Giacomo Rizzolatti and Trevor Robbins, he was awarded the brain prize.

The Languages of the Brain

Friday, September 1, 2017, 03:30 pm. The Forum

How did language and mathematics emerge in humans during the course of evolution? Scientists since Galileo have insisted that mathematics is structured as a language – but is this language similar to spoken language? Do mathematicians use classical language areas when doing mathematics? In the first part of the talk, I will present converging evidence that the left posterior superior temporal sulcus (pSTS) and inferior frontal gyrus (IFG, pars triangularis and orbitalis) play a central role in the syntax of spoken and written natural languages. In the second part, I will present fMRI studies investigating whether these brain areas also contribute to various aspects of mathematics. When professional mathematicians reflect upon high-level mathematical concepts in algebra, analysis, geometry or topology, the activation spares classical language areas. Instead, high-level mathematics involves bilateral intraparietal areas involved in elementary number sense and simple arithmetic, and bilateral infero-temporal areas involved in processing Arabic numerals. The evidence suggests that the acquisition of mathematical concepts recycles areas involved in elementary number processing. My conclusion will be that human brains are attuned to many different languages – spoken, written, mathematical, musical... – and that brain evolution may have endowed the human brain with a widespread ability to manipulate nested syntactic structures in most, if not all domains of human cognition.

KEYNOTE ADDRESS 3

Chih-Jen Lin

National Taiwan University, Taiwan, ROC

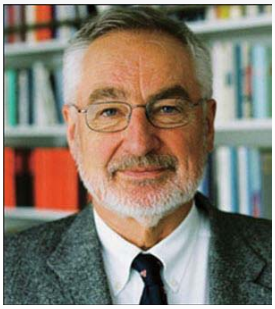
Chih-Jen Lin is currently a distinguished professor at the Department of Computer Science, National Taiwan University. He obtained his B.S. degree from National Taiwan University in 1993 and Ph.D. degree from University of Michigan in 1998. His major research areas include machine learning, data mining, and numerical optimization. He is best known for his work on support vector machines (SVM) for data classification. His software LIBSVM is one of the most widely used and cited SVM packages. For his research work he has received many awards. Including the ACM KDD 2010 and ACM RecSys 2013 best paper awards. He is an IEEE fellow, a AAAI fellow, and an ACM fellow for his contribution to machine learning algorithms and software design. More information about him can be found at http://www.csie.ntu.edu.tw/~cjlin.

Statistical Learning: Status and Challenges

Saturday, September 2, 2017, 10:30 am. The Forum

Machine learning is growing rapidly in all areas. It is the major driving force behind the recent resurgence of AI (Artificial Intelligence). Among various machine learning techniques, statistical learning significantly contributes to the progress of big data and deep learning. In this talk, we first introduce the basic idea behind statistical learning for data classification. Then we discuss the limitation of such techniques and the concerns of the recent explosion of AI.

KEYNOTE ADDRESS 4



Ernst Pöppel

Ludwig-Maximilians-University Munich, Germany

Ernst Pöppel has studied psychology and biology in Freiburg and Munich (Germany), and he received in 1968 his doctoral degree in Innsbruck (Austria). He worked at the Max-Planck-Institute of Psychiatry in Munich where he did some neurophysiological research on information processing in the early visual pathway. He has also worked in the Massachusetts Institute of Technology (MIT) in Cambridge, where he discovered the well-known "blindsight" phenomenon. He became full professor of Medical Psychology at Munich University (LMU) in 1976 and founded the Institute of Medical Psychology (IMP). Over the decades he supervised some 200 doctoral dissertations; his co-workers in the IMP came from more than 40 countries. He has also served in or founded several other prominent national and international academic organizations, such as the National Research Center Jülich, the Human Science Center at LMU, the National Academy of Science Leopoldina (Germany), the European Academy of Sciences and Arts (Salzburg), the Academia Europaea (London), and the Russian Academy of Education (Moscow). Since 2002 he is guest professor of Peking University working and publishing together with Yan Bao, and supervising common students.

Distinction Between Cognitive Content and Operative Logistics in a Taxonomy of Functions

Sunday, September 3, 2017, 10:30am. The Forum

It is claimed that what is needed in cognitive science is a reliable taxonomy of functions which is not a mere reflection of the physical description of the world (a long-term heritage of classical psychophysics), or simply a copy of everyday language with the implicit assumption that subjective phenomena map isomorphically onto language. Alternatively, it is suggested to further develop a taxonomy of functions which is based on neuropsychological observations and evolutionary principles. The basic characteristics of this taxonomy is the distinction between content functions as indexed for instance in perceiving or remembering (the WHAT), and logistical functions like activation of neural systems or temporal organization within the neural machinery (the HOW). The logical basis for this taxonomy is that the loss of a function is a proof of its existence. Content functions are represented by specific spatio-temporal patterns of neural activations with the necessary participation of local modules; it should be appreciated in this context that content functions may be implemented on an implicit level as the phenonmenon of "blindsight" shows. Logistical functions on the contrary comprise the entire neural machinery as can be observed in the circadian modulation of content functions. Another logistical challenge for the brain is the temporal organization of spatially and temporally distributed activities. Time windows implemented as "relaxation oscillations" (which can be entrained instantaneously in contrast to "pendulum oscillations" like the alpha-rhythm in occipital regions) serve the purpose to reduce complexity in the temporal domain of some tens of milliseconds and to provide the basis for "content of consciousness"; the creation of perceptual and conceptual identity of content takes place with another neural mechanisms in the domain of some three seconds. Logistical functions represent anthropological universals; they are implemented pre-semantically. Content functions are open to imprinting due to specific environments, thus, reflecting cultural specifics.

INVITED & SELF-INITIATED SYMPOSIA

SCHEDULE OVERVIEW

FRIDAY, SEPTEMBER 1, 2017, 03:30 – 05:00 PM

S1-1: Consciousness and Self: Levels, Limits, and the Spontaneous Brain

S1-2: Open Issues and Scientific Challenges for EEG/MEG Research in the Real World

SATURDAY, SEPTEMBER 2, 2017, 08:30 – 10:00 AM

S2-1: Social Cognitive and Social Neuroscience: Insights from Animal and Human Studies

S2-2: Acquisition and Comprehension of Linguistic Dependencies: Empirical Evidence from Lifespan Development of Sentence Processing

SATURDAY, SEPTEMBER 2, 2017, 01:00 – 02:30 PM

S2-3: Perception and Media Technology

SATURDAY, SEPTEMBER 2, 2017, 03:00 – 04:30 PM

S2-4: Language Experience and Neuroplasticity across Lifespan

S2-5: Socio-Cognitive Neuroscience from Self to Culture

SUNDAY, SEPTEMBER 3, 2017, 08:30 – 10:00 AM

S3-1: Mathematical Cognition and the Brain

S3-2: Neural Mechanisms for Context-Dependent Preferences

S1-1: CONSCIOUSNESS AND SELF: LEVELS, LIMITS, AND THE SPONTANEOUS BRAIN

FRIDAY, SEPTEMBER 1, 2017, 03:30 – 05:00 PM, LOCKE ROOM

Organizer: Timothy Lane, Taipei Medical University-Shuang Ho Hospital, Taiwan

Presenters: Changwei W. Wu, Philip Tseng, Niall Duncan, Tsu Tzu-Yu, Timothy Lane

For two decades cognitive neuroscience and philosophy have been collaborating, seeking to make progress in understanding the nature of self and consciousness. One of the principal points of shared interest is how to make investigation of these phenomena empirically tractable. Our symposium will both serve to highlight this collaboration and to provide a progress report concerning some specific investigations. The symposium will treat neuronal investigations of levels of consciousness, self-consciousness, quasi-consciousness in memory, consciousness in conflict detection, and disorders of consciousness.

CHANGES OF CONSCIOUSNESS AND BRAIN CONNECTIVITY IN SLEEP AND WAKEFULNESS

Speaker: Chang-Wei W. Wu, Taipei Medical University-Shuang Ho Hospital, Taiwan

MEMORY STRENGTH FOR UNCONSCIOUS MEMORY IN CONTEXTUAL CUEING

Speaker: Philip Tseng, Taipei Medical University-Shuang Ho Hospital, Taiwan

INVESTIGATING A RELATIONSHIP BETWEEN THE SELF AND INTRINSIC BRAIN ACTIVITY

Speaker: Niall Duncan, Taipei Medical University-Shuang Ho Hospital, Taiwan

INTRINSIC ACTIVITY AFFECTS ASYMMETRY IN SENSITIVITY TO TEMPORAL ASYNCHRONY OF AUDIO-VISUAL ORDERING: AN EEG STUDY

Speaker: Tzu-Yu Hsu, Taipei Medical University-Shuang Ho Hospital, Taiwan

TEMPORAL DIMENSIONS OF THE BRAIN'S INTRINSIC ACTIVITY AND LEVELS OF CONSCIOUSNESS

Speaker: Timothy Lane, Taipei Medical University-Shuang Ho Hospital, Taiwan

S1-2: OPEN ISSUES AND SCIENTIFIC CHALLENGES FOR EEG/MEG RESEARCH IN THE REAL WORLD

FRIDAY, SEPTEMBER 1, 2017, 03:30 – 05:00 PM, ALEXANDER ROOM

Organizer: Michelle Liou, Academia Sinica, Taiwan

Presenters: Yuan-Pin Lin, Arthur C. Tsai, Sergey S. Tamozhnikov, Yong-Sheng Chen, Li-Fen Chen

The EEG/MEG technology has been widely applied in real world settings, such as long-term recordings while a subject playing computer games in social interactions and communication studies. Because of large-scale EEGs/MEGs and the nature of complex stimuli, data processing and analysis become challenge for researchers. This symposium will focus on recent advancement in the real world EEG/MEG technology with particular reference to data processing and analysis. We will address a few open issues in brain research based on real world EEG/MEG techniques.

EXPLORING EMOTION-RELATED SPATIO-SPECTRAL EEG OSCILLATIONS IN A LONGITUDINAL MUSIC-LISTENING STUDY

Speaker: Yuan-Pin Lin, Institute of Medical Science and Technology, National Sun Yat-sen University, Taiwan

SPARSE BAYESIAN APPROACH FOR PHYSIOLOGICALLY PLAUSIBLE COMPACT AND

SMOOTH SPATIOTEMPORAL INDEPENDENT EEG SOURCE IMAGING
Speaker: Arthur C. Tsai, Institute of Statistical Science, Academia Sinica, Taiwan
LONGITUDINAL STUDY ON RESTING-STATE EEGS IN CHILDREN: A CONNECTION BETWEEN DMN ACTIVITY AND EFFORTFUL CONTROL
Speaker: Alexander N. Savostyanov, Professor, Institute of Physiology and Basic Medicine, Novosibirsk, Russia
SUPERVISED LEARNING FOR NEURAL MANIFOLD USING SPATIOTEMPORAL BRAIN ACTIVITY
Speaker: Yong-Sheng Chen, Department of Computer Science, National Chiao Tung University, Taiwan
SYMPOSIUM DISCUSSANT
Speaker: Li-Fen Chen, Institute of Brain Science, National Yang-Ming University, Taiwan

S2-1: Social Cognitive and Social Neuroscience: Insights from Animal and Human Studies

SATURDAY, SEPTEMBER 2, 2017, 08:30 – 10:00 AM, LOCKE ROOM

Organizer: Wen-Sung Lai, National Taiwan University, Taiwan
Presenters: Larry Young, Ya-Wei Cheng, Wen-Sung Lai
The last decade has witnessed exceptional convergence between the social sciences and the neurosciences resulting in several intriguing new research fields including social cognition and social neuroscience. It has become increasingly apparent that the brain cannot be considered as an isolated entity, without consideration of the influences from other individual and social environments. This symposium shows how researches using neuroscientific approaches contribute insights and answers to the understanding of social cognition and social neuroscience in both humans and animals.

THE NEUROBIOLOGY OF SOCIAL BONDING AND EMPATHY-RELATED BEHAVIOR: IMPLICATIONS FOR AUTISM
Speaker: Larry J. Young & Silvio O. Conte, Center for Oxytocin and Social Cognition, Department of Psychiatry and Behavioral Sciences, Emory University, Atlanta GA, USA
NEUROBIOLOGICAL BASIS FOR LACK OF EMPATHY IN AUTISM AND PSYCHOPATHY: EVIDENCE FROM EMPATHY IMBALANCE HYPOTHESIS
Speaker: Ya-Wei Cheng, Institute of Neuroscience, National Yang-Ming University, Taipei, Taiwan
GETTING INSIGHTS FROM STUDYING SOCIAL EAVESDROPPING IN GOLDEN HAMSTERS AND PERCEIVED UNFAIRNESS ON DECISION MAKING IN HUMANS
Speaker: Wen-Sung Lai, Hong-Hsiang Liu
Department of Psychology, National Taiwan University, Taipei, Taiwan

S2-2: ACQUISITION AND COMPREHENSION OF LINGUISTIC DEPENDENCIES: EMPIRICAL EVIDENCE FROM LIFESPAN DEVELOPMENT OF SENTENCE PROCESSING

SATURDAY, SEPTEMBER 2, 2017, 08:30 – 10:00 AM, ALEXANDER ROOM

Organizer: Hsu-Wen Huang, City University of Hong Kong, Hong Kong
Presenters: Zhou Jiangling, Haoyan Ge, Denise Hsien Wu, Hsu-Wen Huang, Peng Zhou
A key property of human language is that it consists of a finite set of discrete words which can be combined in various ways to generate an infinite number of sentences. The combination of words into phrases and sentences is governed by rules which are shared among speakers of specific languages, so that people can communicate successfully even through novel expressions. In sharp contrast with the ostensible ease of acquisition and comprehension of "internalized rules" (i.e., shared understanding of dependencies among words in sentences) in natural language, understanding how such capacities are supported by functional and neuroanatomical computations of the cognitive system has been challenging. This symposium presents empirical research on populations with different language backgrounds at different ages, as well as those with disorders, which helps to shed light on how dependencies among words in sentences are acquired and comprehended by beginning and mature speakers across acquisition contexts. Specifically, one talk focuses on bilingual children's interpretation of omitted objects, one talk examines how bilingual adults use and integrate prosodic information, one talk addresses differences in processing subject-relative and object-relative clauses, one talk discusses age-related changes of using contextual information, and another investigates how autistic children use word order and morphosyntactic cues in sentence comprehension. In addition to showing how rich findings from diverse populations with different prior knowledge in the cognitive system can help reveal the underlying mechanisms of sentence processing in particular, the present symposium also highlights how the employment of multiple research tools with different functions can help elucidate the complexity of human cognition in general.

CANTONESE-ENGLISH BILINGUAL CHILDREN'S INTERPRETATION OF OMITTED OBJECTS: AN EXPERIMENTAL STUDY
Speaker: Zhou Jiangling, Ph.D, Chinese University of

Hong Kong, Hong Kong
Virginia Yip, Professor, Chinese University of Hong Kong, Hong Kong
HOW CANTONESE-ENGLISH BILINGUAL ADULTS USE PROSODY TO INTERPRET FOCUS IN ENGLISH: EVIDENCE FROM EYE MOVEMENT IN THE VISUAL WORLD PARADIGM
Speaker: Haoyan Ge, Ph.D, Chinese University of Hong Kong, Hong Kong
Ziyin Mai, Assistant Professor, Chinese University of Hong Kong, Hong Kong
CONVERGING EVIDENCE FOR THE PROCESSING ADVANTAGE OF OBJECT-RELATIVE CLAUSES IN CHINESE SENTENCES
Speaker: Denise Hsien Wu, Institute of Cognitive Neuroscience, National Central University, Taoyuan, Taiwan
AGE-RELATED CHANGES IN THE USE OF PREDICTIVE MECHANISMS DURING SENTENCE COMPREHENSION
Speaker: Hsu-Wen Huang, Department of Linguistics and Translation, City University of Hong Kong, Hong Kong
SENTENCE COMPREHENSION IN CHILDREN WITH AUTISM
Speaker: Peng Zhou, Tsinghua University, China

S2-3: PERCEPTION AND MEDIA TECHNOLOGY

SATURDAY, SEPTEMBER 2, 2017, 01:00 – 02:30 PM, LOCKE ROOM

Organizer: Su-Ling Yeh, National Taiwan University, Taiwan
Presenters: Yi-Ping Hung, Shao-Yi Chien, Polly Huang, Su-Ling Yeh
This symposium shows how researchers apply human perception and user experience to media technology such as virtual reality, image processing, three-dimensional modelling, and voice transmission processing. Through the interdisciplinary approach, it is expected to see creative uses of media technology to enhance our perceptual experience and maintain a well-balanced healthy life.

PERCEPTION OF USER MOVEMENTS WHEN EXPLORING LARGE VIRTUAL ENVIRONMENTS IN A LIMITED PHYSICAL WORKSPACE
Speaker: Yi-Ping Hung, Tainan National University of the Arts and National Taiwan University, Taiwan
PERCEPTUAL VIDEO CODING AND IMAGE PROCESSING: SIGNAL FIDELITY AND HUMAN PERCEPTION
Speaker: Shao-Yi Chien, National Taiwan University, Taiwan
USER-CENTRIC VOICE NETWORKING FOR THE MOBILE ERA - HOW TO STRIKE A BALANCE BETWEEN USER DEMAND AND SCARCE RESOURCE
Speaker: Polly Huang, National Taiwan University, Taiwan
BLUE-LIGHT EFFECTS ON HUMAN PERCEPTION AND COGNITION
Speaker: Su-Ling Yeh, National Taiwan University, Taiwan

S2-4: LANGUAGE EXPERIENCE AND NEUROPLASTICITY ACROSS LIFESPAN

SATURDAY, SEPTEMBER 2, 2017, 03:00 – 04:30 PM, LOCKE ROOM

Organizer: Chia-Ying Lee, Academia Sinica, Taiwan
Presenters: Denise Hsien Wu, Ping Li, Chia-Lin Lee, Chia-Ying Lee
Brain is our most fascinating organ which undergoes functional and structural renovation to adapt the changing world throughout life. Meanwhile, language is the most remarkable ability for human being to interact with the world. This symposium will take language as the core ability, to discuss how functional and structural changes take places in the brain as results of ones' age, learning experience with first and second languages, language-specific characteristics, and individual differences on other cognitive function.

HOW ORTHOGRAPHY-BASED AND PHONOLOGY-BASED TYPING METHODS AFFECT ORTHOGRAPHIC PROCESSING OF CHINESE CHARACTERS
Speaker: Denise Hsien Wu, National Central University, Taiwan
NEUROPLASTICITY AND SECOND LANGUAGE LEARNING: IDENTIFYING FUNCTIONAL AND STRUCTURAL BRAIN CHANGES
Speaker: Ping Li, Pennsylvania State University, USA
ALTERED LATERALIZATION NETWORK FOR LANGUAGE IN HEALTHY YOUNGER AND OLDER ADULTS
Speaker: Chia-Lin Lee, National Taiwan University, Taiwan
DEVELOPMENTAL CHANGES OF THE ORTHOGRAPHIC SENSITIVITY IN THE BRAIN
Speaker: Chia-Ying Lee, Academia Sinica, Taiwan

S2-5: SOCIO-COGNITIVE NEUROSCIENCE FROM SELF TO CULTURE

SATURDAY, SEPTEMBER 2, 2017, 03:00 – 04:30 PM, ALEXANDER ROOM

Organizer: Jun Saiki, Kyoto University, Japan
Presenters: Keng-Chen Liang, Akihiko Nikkuni, Chien-Te Wu, Nobuhito Abe, Bo-Cheng Kuo, Yoshiyuki Ueda

One important function of our cognitive system is to understand our environment, which is defined as the conditions that you live or work in and the way that they influence how you feel or how effectively you can work (Cambridge English Dictionary). Thus, our environment contains not only physical environment already extensively studied in cognitive science, but also social and internal environment critically important for our daily lives. Recently, research on social and internal environment make a great progress. This symposium raises an issue of understanding social and internal environment, and discuss from a broad perspective in both topics (from self to culture) and scale of investigation (single neurons, brain regions, and individual behavior). At single neuron level, we feature two talks discussing micro-level biological basis of self and prosocial behavior; prosocial behavior with rats (Liang), and self-evaluation in primate vision (Niikuni). At the level of system neuroscience, two talks discuss macro-level brain mechanisms underlying high-level human social functions; trust (Wu) and (dis)honesty (Abe). The last two talks address the effect of social environment on cognitive mechanisms. Emotion can be considered as an internal response mediated by social interaction between others and self, and one talk (Kuo) discusses the modulatory effects of emotion on cognitive processes. Social environment covers a broad spectrum from person-to-person relation to a large community and culture. The last talk (Ueda) addresses the effect of culture on cognition. Taken together, these six interrelated talks reveal breadth and depth of socio-cognitive neuroscience on social and internal environment, and provide hints to integrate biology and psychology, studies on self and others, and those on micro and macro social environments. The symposium will discuss current status and future direction of this important research area.

NEUROBIOLOGY OF PROCESSING ENVIRONMENTAL DANGER FOR SELF AND OTHERS IN RATS
Speaker: Keng-Chen Liang, National Taiwan University, Taiwan,

SELF-EVALUATION IN VISION OF MONKEYS AND HUMANS
Speaker: Akihiko Nikkuni, Kyoto University, Japan

HOW DOES YOUR POLITICAL COLOR "DYE" YOUR TRUST?
Speaker: Chien-Te Wu, National Taiwan University, Taiwan

WHO IS DISHONEST AND WHY: NEURAL PREDICTORS OF DISHONEST BEHAVIOR
Speaker: Nobuhito Abe, Kyoto University, Japan

TOP-DOWN MODULATION OF THREATENING REPRESENTATIONS IN VISUAL WORKING MEMORY
Speaker: Bo-Cheng Kuo, National Taiwan University, Taiwan

VISUAL PROCESSING DEVELOPS IN RESPONSE TO CULTURAL FACTORS
Speaker: Yoshiyuki Ueda, Kyoto University, Japan

S3-1: MATHEMATICAL COGNITION AND THE BRAIN

SUNDAY, SEPTEMBER 3, 2017, 08:30 – 10:00 AM, LOCKE ROOM

Organizer: Nai-Shing Yen, National Chengchi University, Taiwan
Presenters: Erik Chihhung Chang, Denise Hsien Wu, Xinlin Zhou, Carlo Semenza, Ting-Ting Chang, Brian Butterworth, Pekka Räsänen

The last five years have seen major advances in the neurobiological basis of mathematical cognition, especially of processes involved in numbers and arithmetic. The neural networks involved have been studied in much greater detail using new brain imaging methods, and the genetic basis of numerical competences have been explored in studies of twins, families, individuals with genetic anomalies and in potentially ancestral versions we share with other species. The knowledge acquired in these ways can help us understand individual differences in mathematical competencies. This in turn can help us design learning contexts for individual learners, and to integrate the basic science into educational policy.

THE MODULATION OF NUMBER-RESPONSE MAPPING BY HYPNOTIC SUGGESTION
Speaker: Erik Chihhung Chang, National Central University, Taiwan
Denise Hsien Wu, Professor, National Central University
Mei-Jing Lin, National Central University, Taiwan

VISUAL FORM PERCEPTION PREDICTS THE 3-YEAR LONGITUDINAL DEVELOPMENT OF MATHEMATICAL ACHIEVEMENT
Speaker: Xinlin Zhou, Beijing Normal University, China

THE CROSS-TALK OF THE TWO HEMISPHERES IN CALCULATION PROCESSES
Speaker: Carlo Semenza, University of Padova, Italy

COMMON AND DISTINCT INTRINSIC INSULA NETWORK ENGAGEMENT UNDERLYING CHILDREN'S READING AND ARITHMETIC SKILLS
Speaker: Ting-Ting Chang, National Chengchi University, Taiwan
Pei-Hong Lee, National Chengchi University, Taiwan
Arron W.S. Metcalfe, University of Toronto, Canada
FROM NEUROSCIENCE TO EDUCATION AND BACK: CORE CAPACITIES AND CORE DEFICITS
Speaker: Brian Butterworth, University College London, UK
MATHEMATICAL COGNITION AND THE BRAIN
Speaker: Pekka Räsänen, Niilo Mäki Institute, Finland

S3-2: NEURAL MECHANISMS FOR CONTEXT-DEPENDENT PREFERENCES

SUNDAY, SEPTEMBER 3, 2017, 08:30 – 10:00 AM, ALEXANDER

Organizer: Shih-Wei Wu, National Yang-Ming University, Taiwan
Presenters: Jian Li, Hiroyuki Nakahara, Hackjin Kim

Recent advances in neuroeconomics have begun to reveal how valuation is shaped by context at the algorithmic and implementation levels. However, context effect in the form of environmental, social, and cultural influences remain largely unknown. This symposium seeks to integrate efforts to understand the impact of contexts from these levels on the neural computations for choice.

MENTAL ACCOUNTING ALLEVIATES COMMITMENT EFFECT
Speaker: Jian Li, Peking University, China
CONTEXT-DEPENDENT COMPUTATIONS FOR SUBJECTIVE PROBABILITY IN THE VMPFC
Speaker: Shih-Wei Wu, National Yang-Ming University, Taiwan
REINFORCEMENT LEARNING WITH ENVIRONMENTAL STRUCTURES AND MIND OF OTHERS
Speaker: Hiroyuki Nakahara, RIKEN Brain Science Institute, Japan
HIERARCHICAL MODEL OF PROSOCIAL VALUE COMPUTATION ALONG THE VENTRAL-TO-DORSAL AXIS OF THE MEDIAL PREFRONTAL CORTEX
Speaker: Hackjin Kim, Korea University, ROK

SYMPOSIA ABSTRACTS

S1-1: Consciousness and Self: Levels, Limits, and the Spontaneous Brain

Friday, September 1, 2017, 01:30 - 03:00 PM

Changes of Consciousness and Brain Connectivity in Sleep and Wakefulness

Chang-Wei W. Wu
Taipei Medical University-Shuang Ho Hospital, Taiwan

Sleep is an important physiological rhythm in the daily life that refreshes our mindset and cognitive functions through an interleaved procedure of consciousness and unconsciousness in the brain. The interesting idea is how our brain automatically turns into the unconscious mode from wakefulness to sleep. Previous studies denoted that the EEG power could be indications of the sleep onset timing. On the top of this, we took another alternative strategy to explore how the brain integrity/connectivity changes dynamically along sleeping process and the waking process. Results indicated that the brain connectivity showed linear reduction when sleep deepens, but on awakening process, the dynamic connectivity change expressed a nonlinear recovery, which implied a dynamic reorganization process after sleep.

Memory Strength for Unconscious Memory in Contextual Cueing

Philip Tseng
Taipei Medical University-Shuang Ho Hospital, Taiwan

The visual system possesses a remarkable ability in learning regularities from the environment, even in the absence of the learner's conscious effort. Here we used a probabilistic contextual cueing paradigm to investigate whether implicit learning and its facilitatory effects are sensitive to the statistical property of such implicit knowledge. Our results showed that search efficiency increased consistently as contextual probabilities increased, and the magnitude of the learning effect also increased slightly with repeated repetitions. Furthermore, even when the total number of exposures was held constant between each probability, the highest probability still enjoyed a greater cuing effect, suggesting that the temporal aspect of implicit learning is also an important factor to consider in addition to the effect of mere frequency. Together, these findings suggest that implicit learning, although bypassing observers' conscious encoding and retrieval effort, behaves much like explicit learning in the sense that its facilitatory effect also varies as a function of its associative strength.

Investigating a Relationship between the Self and Intrinsic Brain Activity

Niall Duncan
Taipei Medical University-Shuang Ho Hospital, Taiwan

A sense of self is arguably prior to consciousness. But where does this sense of self come from? A key area of research in recent neuroscience is the activity that is intrinsic to the brain and which is present independent of external stimuli. There are prima facie reasons to suggest that this intrinsic activity is in some way related to our sense of self. This initial argument will be outlined. After this a number of brain imaging experiments that give some empirical support to the hypothesis will be described. This highlights a number of ways in which intrinsic activity may be linked to self. Finally, initial evidence for altered links between intrinsic activity and self-consciousness in psychiatric disorders will be presented.

Intrinsic Activity Affects Asymmetry in Sensitivity to Temporal Asynchrony of Audio-Visual Ordering: An EEG Study

Tzu-Yu Hsu
Taipei Medical University-Shuang Ho Hospital, Taiwan

When audio and visual stimuli are presented very close to each other in time, different perceptual effects regarding the synchronous/asynchronous perception is depending on which of the two is presented first. The mechanism underlying this asymmetric phenomenon and the time-course according to which asynchronous or synchronous perceptual judgments are still under debate. To address these questions, we combined an audio-visual simultaneity judgment task and EEG. In line with past studies, our results also showed an asymmetric phenomenon where the VA ordering results in a wider time window in which the stimuli are judged to be synchronous/asychrouous than the AV condition. Intriguingly, N1 and P1 amplitudes in response to the first stimulus were found to be higher during AV trials in which participants reported perceiving asynchronous audio and visual stimuli. These results point to possibility that the some information contained in intrinsic activity alternated perceptual experience and affected the subsequent behavioral performance even subjects have not perceived the first stimulus.

Temporal Dimensions of The Brain's Intrinsic Activity and Levels of Consciousness

Timothy Lane
Taipei Medical University-Shuang Ho Hospital, Taiwan

Bayne et al. (2016) take aim at the concept 'levels of consciousness' (LOC), the idea that distinct global states of consciousness are "scalable along a single dimension". They acknowledge the clinical utility of LOC, but argue that treating it as a "central theoretical construct" in consciousness science might be a "fatal" misstep. They deny that the global states associated with sleep, sedation, minimally conscious or other altered states can be

"assigned a determinate ordering relative to each other." Briefly, they suggest that having a "subjective point of view" does not admit of degrees; then, speculating about cognitive functions, they propose two crucial dimensions—gating of conscious contents and exercise of cognitive control. Finally, they insist that multidimensional cognitive models cannot "exonerate" even an amended version of LOC. Although Bayne et al.'s adoption of a multidimensional, cognitive approach suggests a means of improving upon behavior-based assessments, their dismissal of LOC is unwarranted. Electrophysiological investigations of temporal dimensions of the brain's intrinsic activity suggest how distinct global states of consciousness might be ordered relative to one another, in such a way as to contribute to theory development in consciousness science.

S1-2: Open Issues and Scientific Challenges for EEG/MEG Research in the Real World

Friday, September 1, 2017, 01:30 - 03:00 PM

Exploring Emotion-Related Spatio-Spectral EEG Oscillations in a Longitudinal Music-Listening Study

Yuan-Pin Lin
Institute of Medical Science and Technology, National Sun Yat-sen University, Taiwan

Brain-computer interfaces (BCIs) translate human intentions into control signals to establish a direct communication channel between the human brain and output devices. Machines would be further augmented with emotional awareness and intelligence to sense and respond to human affective states. The field of affective brain-computer interface (ABCI) becomes the focus of next-generation BCIs. On the pathway from laboratory ABCI research to real-world applications, one critical challenge is that the brain often switches between different operation modes in ecologically valid environment due to the alternation of individuals' behavioral and mental states. However, most of the current EEG analytical study only focus on single-day/-session data analysis with an assumption that EEG source activities are stationary and spatially fixed. This assumption is likely invalid to the realistic environment. Accordingly, how to model and alleviate nonstationary EEG oscillations accounting for emotional responses is an emerging issue, yet is less addressed in this field. This study aims to (1) perform a longitudinal music- listening study and collect realistic emotion-related EEG signals, and (2) exploit spatio-spectral EEG oscillations and their connections correlated with emotional responses. The successful demonstration can facilitate the design of an emotion-aware model for real-life applications.(Coauthored with Yi-Wei Shen and Kuan-Jung Chiang)Keywords: EEG non-stationarity, affective brain-computer interface, EEG connectivity

Sparse Bayesian Approach for Physiologically Plausible Compact and Smooth Spatiotemporal Independent EEG Source Imaging

Arthur C. Tsai
Institute of Statistical Science, Academia Sinica, Taiwan

Analyzing broad and strongly overlapping far-field scalp projections of underlying spatially distinct locally-synchronous cortical field activities has long posed a challenge for cognitive neuroscience researchers. Even the accurate forward solution was obtained, the source localization problem is still highly underdetermined if multiple sources contribute to the EEG recordings. To attack the indeterminate nature of the EEG source analysis problem, some constraints were usually applied. The linear regulation-based methods (eg. minimum-norm estimators, low resolution tomography, LORETA, etc.) drive solutions to smoothness, whereas parametric dipole fitting and Sparse Bayesian Learning (SBL) algorithms drive source to an opposite direction, sparsity. Here, we propose a new source imaging method whose goal is to obtain more physiologically realistic solutions to the EEG inverse problem by combining a priori knowledge about nature and structure of brain sources, including spatiotemporal independence, sparsity, spatial compactness and local smoothness. The performance of the proposed method is evaluated qualitatively by using experimental and simulated EEG data.(Coauthored with Chii-Shyang Kuo, Cheng Cao, Michelle Liou and Scott Makeig)Keywords: EEG, source localization, spatiotemporal independent component analysis

Longitudinal Study on Resting-State EEGs in Children: A Connection between DMN Activity and Effortful Control

Sergey S. Tamozhnikov
Institute of Physiology and Basic Medicine, Novosibirsk, Russia

This longitudinal study is aimed at exploration of resting-state EEGs in young schoolchildren. A connection between resting-state activity and children's ability in self-control of behavior was analyzed. We acquired three yearly waves of resting state EEG data in 80 children between 7 and 9 years of age and in 55 adults. Children's parents filled out the Effortful Control (EC) scale. Seed-based oscillatory power envelope correlation in conjunction with beamformer spatial filtering was used to obtain electrophysiological signatures of the default mode network (DMN) and two task-positive networks (TPN). In line with existing fMRI evidence, both cross-sectional comparison with adults and longitudinal analysis showed that the general pattern of maturation consisted in an increase in long-distance connections with posterior cortical regions and a decrease in short connections within prefrontal cortical areas. Latent growth curve analysis showed that EC scores were predicted by a linear increase over time in DMN integrity in alpha band and an increase in the segregation between DMN and TPN in beta band. Our findings confirm the neural basis of

those observed in fMRI studies on maturation-related changes and show that integrity of the DMN and sufficient level of segregation between DMN and TPN is a prerequisite for appropriate attentional and behavioral control. Acknowledgement: The study was supported by the grant № 17-06-00055A of the Russian Foundation of Basic Research and the grant № 16-18-00003 of the Russian Science Foundation.(Coauthored with G. G. Knyazev, A. N. Savostyanov, A. V. Bocharov, H. R. Slobodskaya, N. B. Bairova and V. V. Stepanova)Keywords: DMN, the Effortful Control scale, longitudinal study, resting-state EEGs.

Supervised Learning for Neural Manifold Using Spatiotemporal Brain Activity

Yong-Sheng Chen
Department of Computer Science, National Chiao Tung University, Taiwan

Determining the means by which perceived stimuli are compactly represented in the human brain is a difficult task. This study aimed to develop techniques for the construction of the neural manifold as a representation of visual stimuli. We propose a supervised locally linear embedding method to construct the embedded manifold from brain activity, taking into account similarities between corresponding stimuli. In our experiments, photographic portraits were used as visual stimuli and brain activity was calculated from magnetoencephalographic data using a source localization method. The results of 10×10-fold cross-validation revealed a strong correlation between manifolds of brain activity and the orientation of faces in the presented images, suggesting that high-level information related to image content can be revealed in the brain responses represented in the manifold. Our experiments demonstrate that the proposed method is applicable to investigation into the inherent patterns of brain activity.(Coauthored with Po-Chih Kuo and Li-Fen Chen)Keywords: supervised learning, manifold, locally linear embedding, MEG, face orientation

S2-1: Social Cognitive and Social Neuroscience: Insights from Animal and Human Studies

Saturday, September 2, 2017, 08:30 – 10:00 AM

The Neurobiology of Social Bonding and Empathy-Related Behavior: Implications for Autism

Larry Young
Emory University, USA

The socially monogamous prairie vole provides an opportunity to examine the neurobiological and genetic mechanisms underlying complex social cognitive behaviors, including social bonding and empathy-related behaviors. Oxytocin receptor (OXTR) signaling in the nucleus accumbens (NAcc) is critical for pair bond formation between mates. Our data suggest that oxytocin links the neural encoding of the social signature of the partner with the rewarding aspects of mating through interactions with dopamine. Genetic polymorphisms robustly predict natural variation in OXTR expression in the NAcc, which predict pair bonding behavior. Oxytocin also plays a developmental role, organizing the circuits involved in pair bond formation. Neonatal daily social isolations disrupt the ability to form pair bonds as adults in some prairie voles. Voles with high densities of OXTR in the NAcc are resilient to this neonatal neglect. We have also explored the capacity of prairie vole to display empathy-like behavior, specifically consoling. Prairie voles increase their partner-directed grooming toward mates that have experienced an unobserved stressor. This consoling response is abolished blocking oxytocin receptor antagonist into the anterior cingulate cortex, a region involved in human empathy. Finally, Loss of a bonded partner results in the development of depressive-like “grieving” behavior mediated by corticotropin releasing factor (CRF), which suppresses oxytocin secretion. Infusion of oxytocin into the NAcc prevents social loss-induced depression. There are remarkable parallels between these studies of bonding in voles and recent studies on human relationships, suggesting that the neurobiology of social attachment is conserved from rodent to man. In humans, intranasal oxytocin enhances eye gaze into the eyes of others, the ability to infer the emotions of others from facial cues, empathy, and socially reinforced learning. Thus the oxytocin system may be a viable target for drugs to improve social functioning in autism.

Neurobiological Basis for Lack of Empathy in Autism and Psychopathy: Evidence from Empathy Imbalance Hypothesis

Ya-Wei Cheng
National Yang Ming University, Taiwan

Lack of empathy is a hallmark of social impairments in individuals with autism spectrum disorder (ASD) and psychopathy with high callous-unemotional traits (CUT). However, the available empirical evidence to empathic deficits is, at best, contradictory. Given the complexity of the phenomenological experience of empathy, we investigate the neurobiological underpinnings by conceptualizing empathy as a construct that comprises sensorimotor resonance, emotional and cognitive components. Adolescents with ASD, high CUT, and typically developing controls received the quantitative sensory testing of pressure pain thresholds (PPT) along with fMRI scanning and EEG/ERP recording to empathy-eliciting stimuli depicting physical bodily injuries. Results indicate that subjects with ASD subjects had lower PPT but CUT had higher PPT than controls. When perceiving other’s pain, subjects with ASD showed frontal N2 and LPP, which were diminished in those with HCU. In this case, the anterior insular activations was reduced in ASD but heightened in psychopathy. When perceived the agency, the ASD diminished LPP but the HCU retained LPP. Both ASD and HCU groups had normal sensorimotor resonance, indicative of typical

sensorimotor resonance of pain empathy. The findings provide the evidence to empathy imbalance hypothesis, suggesting that, autism and psychopathy as diametrically opposed disorders with empathy imbalance.

Social Cognitive and Social Neuroscience: Getting insights from studying social Eavesdropping in Golden Hamsters and Perceived Unfairness on Decision Making in Humans

Wen-Sung Lai, Hong-Hsiang Liu
National Taiwan University, Taiwan

Social neuroscience is an interdisciplinary field which has made enormous contributions to understand how neurobiological systems implement social processes and behavior. Both animal and human studies play an indispensable role in understanding the underlying mechanisms of social behaviors ranging from social learning to decision making. Two lines of research from our laboratory, the Laboratory of Integrated Neuroscience and Ethology at National Taiwan University, will be introduced in this talk as an example. In the first half of this talk, taking advantage of our established social eavesdropping model and agonistic behavior in male golden hamsters, we investigated behavioral consequence and functional neural activity during a 3-day social learning. Social eavesdropping is a specific type of social learning and it is defined as extracting information about the relative content of signalers from the interactions between the signalers. A set of three experiments was conducted to characterize and record behavioral responses, functional neuroanatomy, and electrophysiological activity during a 3-day social eavesdropping. Compared to males in the neutral and arena control groups, our data revealed that males exposed to fighting interaction had more information perceiving behaviors, more c-Fos labeled neurons in the anterior mid-cingulate cortex (aMCC), and altered neural activity patterns in aMCC during social eavesdropping. Our findings suggest the importance of the aMCC in social signal detection and provide further details regarding social eavesdropping. The second half of the talk concentrates on fairness perception in decision making in humans. By integrating the dictator game and a probabilistic gambling task, we aimed to investigate the effects of a negative experience induced by perceived unfairness on decision making using behavioral, model-fitting, and electrophysiological approaches. Participants were randomly assigned to the “Neutral”, “Harsh”, or “Kind” groups, which consisted of various asset allocation scenarios to induce different levels of perceived unfairness. The monetary gain was subsequently considered the initial asset in a negatively rewarded, probabilistic gambling task in which the participants were instructed to maintain as much asset as possible. Our behavioral results indicated that the participants in the Harsh group exhibited increased levels of negative emotions but retained greater total game scores than the participants in the other two groups. Parameter estimation of a reinforcement learning model using a Bayesian approach indicated that these participants were more loss-aversive and consistent in decision making. Data from simultaneous event-related potential recordings further demonstrated that these participants exhibited larger feedback-related negativity to unexpected outcomes in the gambling task, which suggests enhanced reward sensitivity and signaling of reward prediction error. Our study suggests that a negative experience may be an advantage in the modulation of reward-based decision making.

S2-2 Acquisition and comprehension of linguistic dependencies: Empirical Evidence from Lifespan Development of Sentence Processing

Saturday, September 2, 2017, 08:30 – 10:00 AM

Cantonese-English Bilingual Children’s Interpretation of Omitted Objects: An Experimental Study

Zhou Jiangling[1], Virginia Yip[2]
[1]CUHK-PKU-UST Joint Research Centre for Language and Human Complexity, Hong Kong
[2]Childhood Bilingualism Research Centre, Chinese University of Hong Kong, Hong Kong

Previous corpus-based studies have found that Cantonese-English bilingual children show more non-target object omissions in English than their monolingual peers (Yip & Matthews, 2007; Zhou et al., 2015). Whereas English disallows object omission except for generic objects of optionally transitive verbs (e.g., eat) Cantonese allows omission of objects referring to a discourse topic. It is unclear whether bilingual children distinguish the different semantic properties of omitted objects in comprehension. Given this, we designed a picture selection task to find out how they interpret omitted objects in English and Cantonese. Participants were asked to select the picture(s) that matched a seemingly intransitive sentence (e.g., Winnie was eating) contextualized with a discourse topic serving as a potential object of the verb. Each test sentence was paired with three pictures, one of which was compatible with a non-referential reading of the omitted object but incompatible with a referential reading.Sixty-eight Cantonese-English bilingual children (3;4-7;4) participated in the experiment. The results show that between 51% to 63% of omitted objects in English were interpreted only as the discourse topic by bilingual children at different ages, as compared to 1% in adult controls in this study and 10% in monolingual peers reported in Grüter (2006). Omitted objects in Cantonese were interpreted non-referentially by 3- to 4-year-old bilinguals at a higher rate (40%) than by their monolingual peers (13%). The rate of non-referential readings decreased to 22% in 6- to 7-year old bilinguals, which was nevertheless higher than that of adults (6%). The findings suggest that bilingual children allow the referential reading of omitted objects in English and non-referential reading of omitted objects in Cantonese.

We will discuss factors such as cross-linguistic influence and input ambiguity that may explain the non-target representations and/or processing.

How Cantonese-English Bilingual Adults Use Prosody to Interpret Focus in English: Evidence from Eye Movement in the Visual World Paradigm

Haoyan Ge[1,2], Ziyin Mai[1,2]
[1]CUHK-PKU-UST Joint Research Centre for Language and Human Complexity, Hong Kong
[2]Childhood Bilingualism Research Centre, Chinese University of Hong Kong, Hong Kong

This eye-tracking study investigates how Cantonese-English bilingual adults interpret focus which involves the integration of prosody and other domains of linguistic knowledge (Crain, 2012; Zhou & Crain, 2010) using the Visual World Paradigm (Tanenhaus et al., 1995) In sentences with the focus particle only, different accent placement triggers different sets of alternatives and affects the truth-value of the sentence (Jackendoff, 1972; Rooth, 1992). By contrast, the use of prosody to realize focus in tonal languages like Cantonese is highly constrained, as the pitch range is used for lexical contrasts (Chao, 1947). Twenty Cantonese-English bilingual adults (mean age=20) and twenty native speakers of English (mean age=21) participated in this study. They heard English only-sentences with the accent falls on either the object or the verb (as in (1a-b)) while looking at four pictures. By measuring the time course of eye movements, our study aims to detect the earliest point that participants' fixation patterns give evidence that they consider the alternatives. A post-test acoustic task was conducted to examine whether the two groups are able to detect the placement of accent in speech perception. We found a significant main effect for group after the object was heard: native controls performed anticipatory eye-movements to the alternatives before the offset of not based on the presence of prosodic cues, whereas Cantonese speakers did not fixate more on the alternatives until they heard the verb following not. In the acoustic task, both groups demonstrated around 90% accuracy rate and the reaction time did not reveal significant differences between groups. Our results suggest that though bilingual adults are able to detect accent placement, they have difficulty in integrating prosodic cues and other levels of linguistic knowledge as native controls do. Our findings have implications for understanding the processing of interface phenomenon in bilingual speakers.

Converging Evidence for the Processing Advantage of Object-Relative Clauses in Chinese Sentences

Denise Hsien Wu[1,2]
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To comprehend the meaning of a sentence correctly requires the understanding of the meanings of individual words as well as the additional syntactic process to take the word order into account. Given that subject-relative clauses (SRCs) and objective-relative clauses (ORCs) express different meanings via an identical or similar set of words with different orders, they have been used extensively in research to examine the functional and neuroanatomical underpinnings of syntax. For head-initial languages, such as English, the advantage of processing SRCs over ORCs has been consistently reported. In this talk, we present empirical evidence from psycholinguistic and neurolinguistic experiments aiming to investigate whether the same preference for SRCs over ORCs would be observed in a head-final language, namely, Chinese. Consistent results from self-paced reading and eye-tracking experiments, as well as from neuroimaging experiments when participants' brain responses were recorded simultaneously via event-related potentials or functional magnetic resonance imaging, showed an advantage of ORCs over SRCs in native speakers of Chinese. Although such findings were compatible with the theoretical accounts that postulate contribution of working memory (WM) to sentence comprehension, independent measurements of participants' WM indexed by conventional digit span, word span, and symmetry span did not correlate with the ORC preference in individual participants. Therefore, a memory mechanism specific to syntax was hypothesized. This line of research not only informs the theories of RC processing in specific, but also sheds light on how dependencies across words in sentences might be comprehended with the assumed support of memory-related resources in general.

Age-Rlated Canges in the Use of Predictive Mechanisms during Sentence Comprehension

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Normal aging is accompanied by changes in both structural and functional cerebral organization. Although verbal knowledge seems to be relatively stable across the lifespan, there are age-related changes in the rapid use of that knowledge during on-line language processing. The current study examined sentence comprehension processes with auditory stimuli. Participants listened to high and low constraint sentences followed by predicted and unpredicted (but plausible) words for comprehension. Effects were examined by measuring ERP responses to the final word. Both age groups showed constraint main effect on N1 prominent at frontal electrodes - high constraint sentences elicited an enhanced N1 than low constraint sentences did, and shared similar amplitude size and latency of N1 with each other. Besides, predictability effect on N400 is observed in both groups - predicted words elicited reduced N400 than unpredicted words. This effect was smaller and later for older adults.

However, whereas richer information eases word processing only on predicted word in young groups - predicted words embedded in high constraint sentences elicited a smaller N400 than that embedded in low constraint sentences, this was not clear in older groups. Interestingly, young group also displayed a post-N400 frontal positivity for unpredicted word, which only observed in high constraint sentences and was suggested reflecting the cost of misprediction of the next coming word. There is no such tendency in older adults (as a group).Overall, although context provides top-down information facilitating attention allocation very early, older adults seemed failed to effectively make use of context information to guide semantic processing.

Sentence Comprehension in Children with Autism

Peng Zhou
Tsinghua University, China

The present paper reports the findings of two studies that were designed to investigate how high-functioning children with autism use different linguistic cues in sentence comprehension. Two types of linguistic cues were investigated: word order cues and morphosyntactic cues. 75 four- and five-year-old children with autism (diagnosed using the DSM-IV-TR and the ADOS) and 80 age-matched typically developing children participated in the studies. The results show that children with autism were sensitive to both word order and morphosyntactic cues in sentence comprehension. However, compared to their age-matched typically developing peers, children with autism relied significantly more on the word order cue and exhibited significantly more difficulties in interpreting sentences in which the interpretation led by the morphosyntactic cue contradicts the interpretation led by the word order cue (Study 1). We propose that the difficulties experienced by the autism children are due to their problems in revising the initial interpretation initiated by the word order cue when they later encountered the morphosyntactic cue in the sentence. This proposal is supported by the findings of Study 2. We found that children with autism were able to use the morphosyntactic cue as effectively as their age-matched typically developing peers, when the morphosyntactic cue became the first cue that children could use in a sentence, and the use of the cue would lead to the correct interpretation of the sentence without requiring a revision of a previously built interpretation. We then discuss the implications of the current findings for understanding the nature of the sentence processing mechanism in children with autism.

S2-3: Perception and Media Technology

Saturday, September 2, 2017, 01:00 - 02:30 PM

Perception of User Movements When Exploring Large Virtual Environments in a Limited Physical Workspace

Yi-Ping Hung
Tainan National University of the Arts and National Taiwan University, Taiwan

Due to the progress of new technologies, the price of high-quality head-mounted displays (HMDs) has recently dropped to a new low level which dramatically accelerates the research and development in the field of virtual reality (VR). While immersive VR can virtually take users to various remote sites and provide them fascinating and compelling experience, it is still a challenge on how to explore a relatively large virtual environment when the users are wearing an immersive headset and situated in a limited physical workspace. In this work, we focus on designing methods to enable users to move in the 3D physical workspace when exploring a relatively large 3D environment. For example, we allow the users to explore a large cave, Mogao Cave #61 in Dunhuang, either by walking on a small carpet or by repeatedly jumping-and-sliding. User studies are conducted to investigate the perceptual effects caused by different types of movements, such as jumping-and-sliding, sitting-and-maneuvering, and spider-silking.

Perceptual Video Coding and Image Processing: Signal Fidelity and Human Perception

Shao-Yi Chien
National Taiwan University, Taiwan

In the past decades, researchers in video coding and image processing pursue for high fidelity of image/video communication through limited transmission bandwidth. The system performance is often measured with signal to noise ratio (SNR), that is, perfectly image/video reconstruction is the goal of these systems. However, the final receivers of image systems are actually human vision systems. System design with SNR as the target is often overkilled and sometime ill-posed. In recently years, a raising field is perceptual image/video processing, where human perception models are taken into consideration to further improve the system performance. In this talk, we will provide examples in video coding and image processing for display devices: with perception model, more than 30% of the bitrate can be saved while the perception quality is well kept; with more understandings in human perception, we can further reduce the cost and power consumption, and increase the quality of display devices.

User-Centric Voice Networking for the Mobile Era - How to Strike a Balance between User Demand and Scarce Resource

Polly Huang
National Taiwan University, Taiwan

As the proportion of the multimedia traffic over the Internet through wireless and mobile access rises and the world economy recovers slowly, the issue of streaming Voice/Video content cost-effectively is ever more pressing. The key question to address here is how to satisfy more (paying) users given limited resources. Users switch to

other providers/services because they can't hear/see the content well, not because they detect the fine-grained changes in network loss, delay or jitter, so called Quality of Service (QoS). Over the years, the Internet engineers, although getting very good at designing for QoS, have overlooked the fact that users might not perceive the subtle quantitative difference in QoS metrics to the overall user experience. Towards a user-friendly, therefore economically healthy, mobile Internet, we see the need to measure, understand, and redesign various control mechanisms for quality of user experience (QoE), in addition to the QoS. Using Skype/SILK VoIP service as an example, we show how one (1) measures QoE of calls delivered of different QoS, (2) derives models that translate from QoS to QoE, and (3) exploits the model for a design that pleases the users more under the same resource constraint.

Blue-Light Effects on Human Perception and Cognition

Su-Ling Yeh
National Taiwan University, Taiwan

In daily life we are exposed to a variety of artificial light sources; among them the high energy blue light from electronic devices has attracted much attention recently. Paradoxically people change their light sources to LED bulbs containing blue light while also try to filter out blue light by various devises (e.g., blue light filtered glasses/screen) without knowing much about the blue-light effects. In addition to affect color perception in the image-forming visual pathway, blue light also can impact on the recently discovered intrinsically photoreceptive retinal ganglion cells (ipRGCs) which has a spectral sensitivity peaking at 480nm. Animal studies indicate that blue light via ipRGCs affects circadian rhythm, sleep, and pupil constriction. We show here how, through multidisciplinary approach, to explore and find the blue light effects on different aspects of human spatial vision, time perception, audiovisual integration, and executive functions. With the rapid development of modern technology, collaborative works in different fields nowadays become even more imperative than ever before.

S2-4: Language Experience and Neuroplasticity across Lifespan

Saturday, September 2, 2017, 03:00 - 04:30 PM

How Orthography-Based and Phonology-Based Typing Methods Affect Orthographicprocessing of Chinese Characters

Denise Hsien Wu
Graduate Institute of Cognitive Neuroscience, National Central University, Taiwan

All typing methods for alphabetic languages are based on phonology, as it is straight forward to represent individual letters which correspond to individual phonemes (despite the orthographic depth) in keys. However, for logographic languages such as Chinese, phonology-based typing methods are not the only way to decode orthography in the writing system. To determine whether common or distinct neural substrates underpin typed spelling via an orthography-based (Cang-Jie, 倉頡輸入法) and a phonology-based (Zhu-Yin, 注音輸入法) typing method, functional magnetic resonance imaging was applied. The neuroimaging results from proficient Cang-Jie and Zhu-Yin typists when they performed a written picture naming task and a line drawing task revealed a typical neural network supporting writing behaviors in both groups from the temporoparietal to frontal regions. In addition to the common activations, Cang-Jie typists demonstrated higher activations on the anterior part of right middle frontal gyrus (BA 10) than Zhu-Yin typists, while Zhu-Yin typists demonstrated higher activations on bilateral subcortical regions than Cang-Jie typists. Such findings are likely to reflect that Cang-Jie and Zhu-Yin typists have extensive experience in accessing (output) orthographic knowledge through sub-character combinations stored in long-term memory and through phonology-to-orthography conversion of the lexical writing mechanisms, respectively. In summary, the present study identifies the common neural network underlying the writing behaviors irrespective of languages and typing methods, but it also highlights the specific effects of cultural artifacts on the reliance of different brain regions to access orthography knowledge.

Neuroplasticity and Second Language Learning: Identifying Functional and Structural Brain Changes

Ping Li
Department of Psychology & Center for Brain, Behavior, and Cognition, Pennsylvania State University, USA

How does the learning of a new language change the brain when the brain is already committed to one's native tongue? While mainstream cognitive research on language has previously focused on monolingual processing, recent years have seen a surge of interest in the neuroplasticity as a function of bilingual language experience. In this talk, I ask how second language experience shapes functional and neuroanatomical changes in the bilingual context, and address this question with evidence from a number of our training studies of students who learn Chinese as a second language. We attempt to identify (a) how neurocognitive changes occur as a function of learning contexts (traditional vs. 3D immersive virtual environment), (b) how such changes may capture learning success and effectiveness, and (c) whether such changes may be predicted based on individual learners' neurocognitive profiles. Findings from our studies and other recent studies are beginning to provide insights into the understanding of neuroplasticity (e.g., how learning leads to domain-specific and domain-general brain changes), individual differences (e.g., how cognitive and linguistic abilities impact and predict learning success), and knowledge representation (e.g., how brain networks

reflect knowledge and understanding in monolingual and bilingual contexts).

Altered Lateralization Network for Language in Healthy Younger and Older Adults

Chia-Lin Lee
Department of Psychology, National Taiwan University, Taiwan

Left hemisphere (LH) specialization for language has been a key example of functional lateralization. However, the role of the right hemisphere (RH) and how the two hemispheres work together to process language remain poorly understood. In this talk, I will focus on the left-lateralized network for syntactic category processing, and I will present a series of studies we conducted to investigate how this brain asymmetry is modulated by one's inter-hemispheric communication abilities and whether the modulating factors and the degree of asymmetry change with aging. We used the visual half-field presentation paradigm to assess event-related potential (ERP) responses to syntactic category violations preferentially elicited by the two hemispheres. Additional Diffusion Tensor Imaging (DTI) data and behavioral measures for inter-hemispheric coordination and inhibition were collected from the same individuals. We found that the left-lateralized grammaticality effects in younger adults were predicted by stronger integrity of the superior longitudinal fasciculus (SLF) and genu of the corpus callosum. In addition, younger adults less effective in coordinating information across hemispheres showed more left-lateralized P600 effects. By contrast, bilateral P600 responses were found in older adults. These additional responses were accompanied by lower sensitivity in grammatical judgment. Older adults more susceptible to interference from the contralateral hemisphere showed more bilateralP600s. Together, these studies demonstrated that, similar to the trend previously observed in other cognitive abilities, the degree of lateralization for syntactic category processing is also reduced with aging. The age-related reorganization in this case, however, was not compensatory. Furthermore, these findings suggest that functional brain asymmetry in syntactic category processing may be driven by multiple forces that are weighted differently across the lifespan.

Developmental Changes of the Orthographic Sensitivity in The Brain

Chia-Ying Lee
Institute of Linguistics, Academia Sinica, Taiwan

Learning to read is a process of understanding written speech. During early years of literacy acquisition, children's primary task is to master the orthographic rules that describe a set of orthographic units and mapping principles underlying how orthographic units encode phonology and semantics of a given writing system. As human brain continually reorganizes itself on the basis of input, an emerging research field, educational neuroscience, proposes that it is possible to observe the accompanying changes in the brain when learning take place. In this talk, I will take reading acquisition as an example to explore how neural signatures of orthographic processing change over the course of learning to read by examining the lexicality effect on N400. Our findings revealed that, as children become more advanced readers, the N400 elicited by the noncharacters changes from eliciting more negative N400 in the frontal sites to becoming more positive in the posterior sites when comparing to the one elicited by the real characters or pseudocharacters. The reversed lexicality effects in anterior and posterior sites supports the dual-mechanism for lexical retrieval (Lau, Phillips and Poeppel, 2008) and implies that reading experiences shapes the reliance on the supporting brain mechanisms, such as the executive function, for word recognition. These findings suggest that the time course and the topographic distribution of the lexicality effect on N400 may serve as ERPs markers for the evaluation of orthographic skill development and for the early identification of children at risk of reading difficulties.

S2-5: Socio-Cognitive Neuroscience from Self to Culture

Saturday, September 2, 2017, 03:00 - 04:30 PM

Neurobiology of Processing Environmental Danger for Self and Others in Rats

Keng-Chen Liang
National Taiwan University, Taiwan

Studies have shown that fear memory involves an extensive neural network including some limbic and cortical structures. Observation learning of fear suggests contribution of social interaction to knowing environmental danger, but underlying neural basis remains unclear. We have shown that a rat could acquire fear to environmental danger in various tasks by observing other's behavior. Further, learning from a naïve model benefited the observer more than an expert model. Such findings imply that sensing the contingency between the model's reaction to the signal and its emotion changes, which may be better explicated in a naïve model, is crucial for observation learning. Our data indeed showed that rats displayed empathetic/prosocial behavior to another rat in pain. We thus explored the neural correlates of reaction to other's pain as it is a prerequisite for social learning. Ensemble unit activity was recorded in the anterior cingulate (ACC), insular (InC) and other cortex of a rat when it self or a companion was stressed. We found some ACC and InC units responding not only to one's own but also to others' pain; some of them shared the same excitatory responses to self and other's pain, some had opposite responses: activated by one's own pain but inhibited by other's pain, or vice versa. In a task for prosocial behavior, some ACC and InC units increased activity shortly prior to altruistic behavior.
Shared-response units in the empathetic task increased their ensemble activity as rats performed an altruistic act, and units related to altruistic behavior also increased their

ensemble activity to other's pain, indicative of circuitry overlapping in the two behaviors. Given the involvement of medial frontal cortex and InC in observation learning from our preliminary human data, the role of ACC and InC units in social learning of rodents should be better pursued in the future.

Self-Evaluation in Vision of Monkeys and Humans

Akihiko Nikkuni
Kyoto University, Japan

When we are conscious of a sensory event, we can assess a certain or uncertain status of sensory experience. Such a self-evaluation, the confidence, is regarded as a key index of conscious awareness. However, it has been not well understood how humans and other primates compute confidence for their perceptual experiences. Using a modified wagering task, we first estimated confidence levels of visual percepts in monkeys. In this task, we gave the monkeys the option of abandoning the visual discrimination (associated with a big reward only in correct trials) and choosing an opt-out bar (always associated with a small reward). The monkeys touched the opt-out bar more frequently when the stimulus ambiguity increased. The behavioral data were consistent with the view that they opted out when they were less confident in their judgment.
During the task, we recorded single unit activities from the pulvinar (a higher-order nucleus of visual thalamus) and found out that the pulvinar response magnitude decreased in the order of correct trials, error trials and opt-out trials. While this result suggested that the pulvinar responses correlate with the confidence levels of monkeys, it remains unclear whether the monkeys' confidence really corresponds to the subjective form of humans' confidence.
To examine this issue, we second performed the human psychophysics with six ratings of subjective confidence. We found that human's confidence scores showed the same patterns as the modulations of monkey's pulvinar activities. In line with a statistical framework, these results indicate that a common computation works for confidence reports in monkeys and humans, thereby bridging gaps between the findings on conscious awareness from different species.

How Does Your Political Color "Dye" Your Trust?

Chien-Te Wu
National Taiwan University, Taiwan

Trust is a basic component that shapes a group in social animals and is known to vary with social contexts. Many studies have demonstrated the power of ascribed identity (e.g., ethnicity, gender) upon trust behaviors among human beings. However, few studies have investigated how acquired identity (e.g., political party) may influence one's trust to another person and the corresponding neural mechanisms. To address this issue, we enrolled 58 healthy adults who share different political identities, defined by their presidential choices in the 2012 Taiwan presidential election (i.e., KMT vs. DPP supporters), to participate a repeated binary trust game experiment while undergoing fMRI scan. Each participant was informed that two types of partner (same and different political identity) were included in the present study. At the behavioral level, we found that political identity modulated cooperative decisions, as reflected in higher frequency of trust decisions when participants were interacting with a partner having the same political identity. At the neural level, our fMRI analyses for the same political identity trials in which the participants' partner defected compared with trials in which the partner reciprocated showed significant hemodynamic signal change in the brain regions implicated in emotional processing (anterior insula), mentalizing (temporoparietal junction), and self-regulatory control (dorsolateral prefrontal cortex). In contrast, participants exhibited greater activation in the striatum (reward learning) in response to different political identity trials in which the partner reciprocated compared with trials in which the partner defect. More importantly, the aforementioned result patterns were observed only for one group, but not the other, even though both groups showed strong sign for in-group preferences. The current results therefore highlight the complexity about how acquired social identities render its influence upon interpersonal trust interactions, which cannot be solely explained by in-group favoritism proposed by the social identity theory.

Who is Dishonest and Why: Neural Predictors of Dishonest Behavior

Nobuhito Abe
Kyoto University, Japan

The neurocognitive mechanisms underlying dishonest moral decisions have yet to be fully clarified. In this talk, I will present the results of functional neuroimaging study, which focused on reward sensitivity as a potential facilitating factor of dishonest behavior. Subjects underwent functional magnetic resonance imaging (fMRI) while completing a monetary incentive delay (MID) task in which they anticipated a monetary reward, no reward, or the avoidance of monetary punishment. Individual differences in reward sensitivity were indexed by the level of fMRI BOLD signal in the nucleus accumbens during the anticipation of reward. Subjects also performed an incentivized prediction task that gave them repeated opportunities to earn money dishonestly by lying. Subjects attempted to predict the outcomes of random computerized coin-flips and were financially rewarded for accuracy. In some trials, subjects recorded their predictions in advance. In other trials, subjects were rewarded based on self-reported accuracy, allowing them to gain money dishonestly by lying about the accuracy of their predictions. Dishonest behavior was indexed by improbably high levels of self-reported accuracy. Results revealed that reward sensitivity in the nucleus accumbens, as measured using the MID task, predicted the frequency

of dishonest behavior across individuals in the coin-flip prediction task. Individuals showing relatively strong nucleus accumbens responses to anticipated rewards also exhibited increased dorsolateral prefrontal activity in response to opportunities for dishonest gain. These results suggest that reward sensitivity is an important determinant of dishonest behavior.

Top-Down Modulation of Threatening Representations in Visual Working Memory

Bo-Cheng Kuo
National Taiwan University, Taiwan

Recent studies have shown that top-down attention biases relevant representations in visual working memory (WM) based on current task goals. Accumulating evidence has also revealed the effects of emotional arousal on attentional processing. However, it remains unclear whether top-down attention can regulate emotional memoranda in WM. Here we investigated the neural mechanisms of top-down modulation on threatening representations during WM maintenance with functional magnetic resonance imaging (fMRI) and electroencephalography (EEG). Participants were instructed to remember a threatening object and a neutral object in a cued variant delayed response WM task. Retrospective cues (retro-cues) were presented to direct attention to the hemifield of a threatening object (i.e., cue-to-threat trials) or a neutral object (i.e., cue-to-neutral trials) during a retention interval prior to the probe test. The fMRI results (N=20) showed greater neural responses in visual areas and amygdala for cue-to-threat objects compared to cue-to-neutral ones and spatiotopic modulation of retro-cue-related activity in visual areas. Moreover, directing attention towards threatening compared to neutral representations during WM maintenance can result in greater regulation of functional connectivity between prefrontal and visual areas. The EEG results (N=18) showed greater magnitude of alpha lateralisation for cue-to-threat objects compared to cue-to-neutral ones. Importantly, we estimated the spatiotemporal pattern similarity in alpha activity for top-down modulations of threatening memoranda. The pattern similarity indexes were significantly higher for the posterior regions relative to the anterior regions and for the cue-to-threat objects relative to cue-to-neutral objects over the posterior regions. Together, these results provide new insights into top-down modulations of threatening representations in visual WM.

Visual Processing Develops in Response to Cultural Factors

Yoshiyuki Ueda
Kyoto University, Japan

Many studies have demonstrated that culture has many effects on our behavior and thinking. In the field of basic visual processing, however, researchers have believed that our processing is universal; that all people see objects in the same way. Some recent studies have indicated cultural differences in visual processing, but others have not. Therefore, it is still controversial whether posteriori factors such as culture and visual environments affect basic perception/cognition or not. Possibly, this discrepancy occurs because the complexity of the experimental tasks draws upon high-level factors that could obscure cultural and environmental effects. Hence, to definitively assess the generality of cultural differences in perception, what is needed are simple tasks that use simple stimuli. To achieve this goal, we examined cultural differences in visual search for geometric figures, a relatively simple task for which the underlying mechanisms are reasonably well known. In the experiment, Japanese and North American participants were asked to search for the longer/shorter line among shorter/longer lines, and we successfully replicated earlier results: North American participants showed a reliable search asymmetry, with faster search for long among short lines than vice versa. However, Japanese participants showed no asymmetry. This difference did not appear to be affected by stimulus density. If the cultural difference in search is based exclusively on a differential engagement of strategic factors such as analytic/holistic processing, it should be invariant across different kinds of stimuli. However, other kinds of stimuli resulted in other patterns of asymmetry differences, suggesting that the cultural differences are not due to strategic factors, but are based instead on the target-detection process. In particular, our results indicate that at least some cultural differences reflect different ways of processing early-level features, possibly in response to environmental factors.

S3-1: Mathematical Cognition and the Brain

Sunday, September 3, 2017, 08:30 – 10:00 AM

The Modulation of Number-Response Mapping By Hypnotic Suggestion

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The classic “missing number 7” phenomenon, though widely publicized as one representative case of hypnosis, remains much of a hype lacking empirical support. Here we examined the conversion between the magnitude and ordinal forms of numerical representation and the corresponding brain activities with FMRI, under the influence of hypnotic suggestion. Two groups of participants performed visual parity judgments by making spatial and non-spatial responses before receiving hypnotic suggestions that either manipulated magnitude or ordinal representations, respectively. We found a significant interaction between the type of suggestion and response under the manipulated magnitude condition, indicating that seeing a number line could elicit the magnitude representation, yet thinking of the magnitude of numbers does not directly elicit the spatial numerical mapping. Furthermore, the linkage between numbers and spatial response correlated with the activation in the right

superior frontal area and left angular gyrus under the magnitude suggestion, and in the right dorsolateral prefrontal cortex under the order suggestion. On the other hand, the linkage between numbers and non-spatial response correlated with the activation in the left ventral intraparietal area under the magnitude suggestion, and right intraparietal sulcus, left ventrolateral prefrontal cortex and left posterior intraparietal sulcus under the order suggestion. Taken together, the current findings indicate that the ordinal and magnitude forms of a number may share distinct features and supported by different brain networks. In addition to demonstrate empirical supports for the effect of hypnotic suggestion on the processing of numbers, the current study also indicates a malleable mapping between number and response codes prone to the influence of task demand and individual differences.

Visual Form Perception Predicts the 3-Year Longitudinal Development of Mathematical Achievement

Xinlin Zhou
School of Brain and Cognitive Science, Beijing Normal University, China

Numerous studies have demonstrated an association between the acuity of the approximate number system (ANS) and mathematical performance. Moreover, studies have shown that ANS acuity can predict the longitudinal development of mathematical achievement. A recent novel explanation of this association is the visual form perception hypothesis (Zhou, Wei, Zhang, Cui, & Chen [2015]. Visual perception can account for the close relation between numerosity processing and computational fluency. Frontiers in Psychology, 6, 1364). The current study aimed to test whether the visual form perception could account for the ANS prediction for longitudinal development of mathematical achievement. One hundred and eighty-eight participants (100 males, 88 females, mean age = 12.2, SD = 0.3) took part in the study. When they were at third grade, they took the tests: numerosity comparison, figure matching as well as mental rotation, non-verbal matrix reasoning and choice reaction time.3-year later, they took mathematical achievement test. The results showed that the ANS acuity measured with numerosity comparison could predict mathematical achievement 3 years later. As expected, the scores on figure matching could account for the longitudinal prediction role of ANS acuity to mathematical achievement. The result further confirms the visual form perception is the underlying cognitive mechanism for the association between ANS acuity and mathematical achievement in the longitudinal development.

The Cross-Talk of the Two Hemispheres in Calculation Processes

Carlo Semenza
Department of Neuroscience, University of Padova, Italy

Clinical studies as well as recent investigations conducted with other methodologies (e.g. neuroimaging, transcranial magnetic stimulation, direct cortical electro-stimulation) leave several unanswered questions about the contribution of the right hemisphere in calculation. All methods increasingly show an involvement of the right hemisphere in functions traditionally believed to be in the domain of the left hemisphere. Novel clinical studies show that right hemisphere acalculia encompasses a wide variety of symptoms, affecting even simple calculation, that cannot be entirely attributed to spatial disorders or to a generic impoverishment of processing resources as previously believed. Moving from the conclusions of these studies, new data will be presented, by means of Direct Cortical Electrostimulation during glioma surgery and Magneto-Encephalography (MEG), concerning simple calculation, i.e., one-digit addition and multiplication. Up to very recent times, these tasks were believed to be carried out by the left hemisphere. The studies reported here show instead how the right hemisphere has its own specific role and that only a bilateral orchestration between the respective functions of each hemisphere guarantees, in fact, precise calculation.
The traditional wisdom that attributes to the right emisphere a role mostly confined to spatial aspects of calculation, needs to be significantly reshaped. The aim of future studies will be to precisely highlight the nature of the cross-talk between the two hemispheres.

Common and Distinct Intrinsic Insula Network Engagement Underlying Children's Reading and Arithmetic Skills

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The neural substrates of children's reading and arithmetic skills have long been of great interest to cognitive neuroscientists. However, most previous studies have focused on the contrast between these skills as specific domains. Here, we investigate the potentially shared processes across these domains by focusing on how the neural circuits associated with cognitive control influence reading and arithmetic proficiency in 8-to-10-year-old children. Using a task-free resting state approach, we correlated the intrinsic functional connectivity of the right anterior insula (rAI) network with performance on assessments of Chinese character recognition, reading comprehension, subtraction, and multiplication performance. A common rAI network emerged for reading and arithmetic skill, including bilateral middle temporal gyri (MTG) and superior temporal gyri (STG) in the lateral temporal cortex, as well as inferior frontal gyri (IFG). In addition to these common substrates, performance measures evidenced rAI network specializations. Tasks requiring higher level of cognitive control, such as subtraction and reading comprehension, were associated with hyper connectivity between rAI and dorsoanterior

cingulate cortex (dACC) and local insula connectivity. Reading comprehension only, rather than character recognition, was associated with connectivity to IFG, MTG and angular gyrus. Furthermore, subtraction was associated with connectivity to premotor cortex whereas multiplication was associated with the supramarginal gyrus. These results indicate that during a critical period for children's acquisition of reading and arithmetic, these skills are supported by both intra-network synchronization and inter-network connectivity of rAI circuits.
Domain-general intrinsic insular connectivity at rest contained also, functional components that segregated into different sets of skill-related networks. The embedded components of cognitive control may be essential to understanding the dynamic interplay of multiple functional circuits necessary to more fully characterize cognitive skill acquisition.

From Neuroscience to Education and Back: Core Capacities and Core Deficits.

Brian Butterworth
Institute of Cognitive Neuroscience & Department of Psychology, University College London, UK

Extensive recent evidence suggests that many species possess a specialized mechanism for extracting numerosity from the environment. If we humans inherit a similar mechanism, this could be the foundation for our numerical competencies - a 'core capacity'. I will suggest that indeed humans possess this core capacity and that individual differences in this capacity contribute to explaining individual differences in arithmetical attainment and correlated neural structures. However, the neuroscience needs the appropriate pedagogical principles before it can be applied. On the basis of this, I will propose ways in which the education of individuals should be shaped, and how the effectiveness of educational practices can shape the questions neuroscience asks.

Mathematical Cognition and the Brain

Pekka Räsänen
Niilo Mäki Institute, Finland

A nationally representative sample of students (n=3507) were followed from the beginning of the 3rd to the end of 9th grade. About half of these also agreed to participate to a follow-up at the end of 12th grade. The development of mathematical performance and attitudes towards mathematics of these students were followed. In this presentation, I will focus on the development of a subsample of poor performing students in this sample. About 5 percentage of students showed a persistent poor performance based on a standardized test and a teacher's evaluation, mathematical learning disabilities (MLD). After 5th grade this group of poor performers was divided into two: one continued following the mainstream curriculum (MLD/C), while the other were given an individualized educational plan (MLD/IEP).
There was a significant difference between these groups in the learning gains from the beginning of the 6th to 9th grade. The MLD/IEP group did not differ from the typically performing students in the amount of learning in calculation skills (no gain in geometry or statistics), while the MLD/C did not show any improvement in learning during four years of mathematics education.
A similar trend was found in attitudes. The MLD/IEP group had a stronger self-concept in mathematics and showed less math-anxiety than the MLD/C group, which had a clear declining trend to negative self-image in mathematics. There were also long-lasting effects to the end of the secondary education from the educational decisions done in the primary education.
The results show that decisions done in the educational system have strong effects on numerical skills and attitudes of students with MLD. The educational history of students with MLD is often the largest unknown variable in cognitive and neuroscientific studies on MLD. Models how to control this unknown this is presented.

S3-2: Neural computations for Context-Dependent Preference

Sunday, September 3, 2017, 08:30 – 10:00 AM

Mental Accounting Alleviates Commitment Effect

Jian Li
Peking University, China

Classical prospect theory assumes different prospects are generated by comparing to the reference point and the default reference point is the status quo. Current decision neuroscience research mainly focuses on the prospects of gains and losses concerning the status quo and has made tremendous advances in the understanding of the underlying neural mechanisms involved in these processes. Here we investigate how human subjects make economic decision under risk, especially after they endure monetary losses in the first place. Contrary to the standard escalation effect of commitment, subjects tended to be less inclined to commit to the risky gamble. However, if the previous loss was "written off" by unexpected windfall, then the de-escalation effect disappeared. We propose the involvement of mental accounting cognitive process and the potential neural computations implicated.

Context-Dependent Computations for Subjective Probability in the VMPFC

Shih-Wei Wu
National Yang-Ming University, Taiwan

Considerable evidence suggests that decisions are highly sensitive to contexts. However, how experience shapes context-dependent computations remain elusive. In a simple stimulus-outcome association task, subjects learned through experience the probability of reward associated with different visual stimuli. On each trial subjects experienced a single stimulus, but over the course of a block of trials, subjects experienced two

stimuli carrying different probabilities of reward. Context was manipulated by pairing stimuli carrying the same probability of reward with stimuli carrying different probabilities of reward in different blocks of trials. In order to measure subjective probability, subjects provided trial-by-trial estimate on the probability of reward associated with the current stimulus. We found that subjective probability associated with a stimulus was affected by the other stimulus present in the context. However, context effect was not universally observed across the entire range of probability – it appeared to be constrained by the variance of experienced outcomes. Stimuli with high variance (50% chance of reward) showed significant context effect, while stimuli with low variance did not (10% and 90% reward). Computational modeling revealed that such effect was reference dependent – the direction of context-induced bias on probability estimates was determined by the variance-weighted difference between local frequency of reward of the stimulus and the average reward frequency of the block (reference point). Using fMRI, we found that the ventromedial prefrontal cortex represents information essential to context-dependent computations for subjective probability. We concluded that variance and reference dependence are two key elements of context-dependent computations for probability acquired through experience.

Reinforcement Learning With Environmental Structures and Mind of Others

Hiroyuki Nakahara
RIKEN Brain Science Institute, Japan

Under the theme of symposium, context-dependent preferences, I will discuss reward-guided learning and decision-making with two particular cases: learning environmental structures under reinforcement learning (RL) and others' mental processes under social decision making. I demonstrate that dopamine activity and related basal ganglia circuit incorporate context dependence for better learning and decision-making under normative understanding of RL. I show you how we also extend RL theory into the realm of social cognition. Combining human fMRI with modeling, I present how one learns to predict the minds of others and also takes account of rewards to others, so as to adjust one's own decisions accordingly. I also plan to present results of some ongoing studies.

Hierarchical Model of Prosocial Value Computation along the Ventral-to-Dorsal Axis of the Medial Prefrontal Cortex

Hackjin Kim
Korea University, Korea

The medial prefrontal cortex (MPFC) is known to play key roles in a wide range of social decision-making, but we are still limited in our understanding of the distinctive roles played by each specific subregions of the MPFC. We have recently shown that the ventral and the dorsal MPFC are primarily involved in computing the value of choices for self and others, respectively. However, such a functional differentiation between the ventral and the dorsal MPFC was prominent among selfish people, but not prosocial people. In prosocial people, the ventral MPFC was engaged in computing values for both themselves and others, possibly revealing its role in encoding internalizedprosocial valuation. A follow-up study from our lab confirmed and further extended these findings, by showing that the MPFC subregions along the ventral-to-dorsal axis can be differentially modulated by situational variables such as observation by others, possibly reflecting the degree of internalization of prosocial valuation. At the end of the lecture, I will summarize the findings from our lab and provide the hierarchical model of value computation for prosocial decision-making to explain when and how distinct subregions of the MPFC can be differentially engaged and interact with each other to maximize one's capacity for adjusting to challenging social contexts.

TALKS AND POSTERS ABSTRACTS

Abstract Numbering System

Each abstract is assigned a unique 5 digit number based on the day, type, and time it is to be presented. The format of the abstract numbering is DTT.NN (where D is the Day, followed by a T for Type (Talk/Poster), a second T for the Time, and finally NN indicate the presentation Number).

Note: For Posters, the last two digits are the board number.

First Digit - Day	1 The First Day (September 1st)
	2 The Second Day (September 2nd)
	3 The Third Day (September 3rd)
Second Digit - Type	1 Talk session
	2 Poster session
Third Digit - Time	1 The First Session of that day
	2 The Second Session of that day
	3 The Third Session of that day
	4 The Forth Session of that day
	5 The Fifth Session of that day
Fourth-Fifth Digits - Number	01, 02, 03...for talks and posters

Examples:

111.01 Day 1, Talk Session, First Talk Session, First Talk

221.01 Day 2, Poster Session, First Poster Session, Poster Board 01

Talk Session Schedule Overview

FRIDAY, SEPTEMBER 1, 2017, 01:30 – 03:00 PM

T1-1: Cognitive Linguistics

SATURDAY, SEPTEMBER 2, 2017, 08:30 – 10:00 AM

T2-1: AI, Robotics, and Philosophy

SATURDAY, SEPTEMBER 2, 2017, 01:00 – 02:30 PM

T2-2: Language Processing

T2-3: Cognitive Neuroscience I

T2-4: Cognitive Development

SATURDAY, SEPTEMBER 2, 2017, 03:00 – 04:30 PM

T2-5: Cognitive Neuroscience II

SUNDAY, SEPTEMBER 3, 2017, 08:30 – 10:00 AM

T3-1: Cognitive Psychology

Poster Session Schedule Overview

FRIDAY, SEPTEMBER 1, 2017, 01:30 – 05:00 PM

P1-1: Cognition, Culture, Development, and Education

SATURDAY, SEPTEMBER 2, 2017, 08:30 – 12:00 PM

P2-1: Cognitive Science, Cognition and Visualization, Cognitive Linguistics, Decision Making

SATURDAY, SEPTEMBER 2, 2017, 01:00 – 04:30 PM

P2-2: Cognitive Psychology, Consciousness, Ergonomics, Human Intelligence, Learning Technology

SUNDAY, SEPTEMBER 3, 2017, 08:30 – 12:00 PM

P3-1: Cognitive Neuroscience, Cognitive Psychology, Functional Brain Imaging, & Brain, Learning, and Development

T1-1: COGNITIVE LINGUISTICS
FRIDAY, SEPTEMBER 1, 1:30 PM – 03:00 PM, ARCHIMEDES ROOM

111.02, 01:30 pm **ENTRENCHMENT AND CREATIVITY IN CHINESE QUADRASYLLABIC IDIOMATIC EXPRESSIONS** Shu-Kai Hsieh, Tai-Li Chou, Chia-Lin Lee, I-Wen Su, Chia-Rung Lu, Te-Hsin Liu, I-Ni Tasi, Benjam in T'sou
111.03, 01:45 pm **THE ACQUISITION OF THE IMPLICIT SYNTAX OF MASS/COUNT NOMINALS BY L2 LEARNERS OF MANDARIN CHINESE** Panpan Yao
111.04, 02:00 pm **SPATIAL LANGUAGE AND COGNITION ACROSS ADULT LIFESPAN: TAIWAN AS A TEST CASE** Yen-Ting Lin, Hui-Chen Hsiao
111.05, 02:15 pm **A COMPARISON OF THE ROLE OF TOP-DOWN FACTORS ON LOCAL READING PROCESSES IN BRAILLE AND PRINT** Ronan G. Reilly, Inthraporn Aranyanak, Ralph Radach, Christian Vorstius
111.06, 02:30 pm **ACQUISITION OF CHINESE CLASSIFIERS BY PRESCHOOLERS WITH CONGENITAL HEARING IMPAIRMENT: INFLUENCES OF LINGUISTIC AND COGNITIVE FACTORS** Ming Lo, Yi-Xiu Lin

T2-1: AI, ROBOTICS AND PHILOSOPHY
SATURDAY, SEPTEMBER 2, 08:30 AM – 10:00 AM, ARCHIMEDES ROOM

211.01, 08:30 am **NVMSIM: A COMPUTER-AIDED-DESIGN TOOL FOR NON-VOLATILE MEMORY BASED COGNITIVE COMPUTING HARDWARE** Darsen D. Lu, Huai-Kuan Zeng, Yi-Ci Wang, Fu-Xiang Liang
211.02, 08:45 am **INTER-INDIVIDUAL DIFFERENCES IN CONSCIOUSNESS DEVELOPMENT VIA A CHILD-ROBOT SCENARIO** Irini Giannopulu, Tomio Watanabe
211.03, 09:00 am **SURPRISE AND NARRATIVE IN AN AUTOMATIC NARRATIVE GENERATION GAME** Jumpei Ono, Takashi Ogata
211.04, 09:15 am **FROM THEORETICAL PERCEPTIONS OF METALOGY TO ANALYZE THE GRIT AND MINDSET THEORY, A QUALITATIVE RESEARCH** Wei-Chun Li
211.05, 09:30 am **HALLUCINATION AND PHENOMENAL PRESENCE** Kevin Kimble
211.06, 09:45 am **PSYCHOLINGUISTIC DETERMINANTS OF OBJECT NAMING IN THAI FOR A SUBSET OF THE BANK OF STANDARDIZED STIMULI** A. J. Benjamin Clarke, Jason D. Ludington

T2-2: LANGUAGE PROCESSING
SATURDAY, SEPTEMBER 2, 01:00 PM – 02:30 PM, ALEXANDER ROOM

212.01, 01:00 pm **AGE OF LANGUAGE ACQUISITION INFLUENCES THE CORTICAL LANGUAGE ORGANIZATION IN MULTILINGUAL PATIENTS UNDERGOING AWAKE BRAIN MAPPING** Viktoria Havas
212.03, 01:15 pm **BILINGUAL PROFICIENCY IN TEXT COMPREHENSION PROCESSES: ELECTROPHYSIOLOGICAL EVIDENCE FROM READING ENGLISH AS A SECOND LANGUAGE BILINGUALS** Chin Lung Yang, Charles A Perfetti
212.04, 01:30 pm **EXPLANATION TYPE PREFERENCE OF ACTION VERB; SOCIAL RELATIONS OF ARGUMENTS** Kwanghyeon Yoo, Kyung Soo Do
212.05, 01:45 pm **GRAPHEME-COLOR SYNESTHESIA IN CHINESE CHARACTERS: WHAT DETERMINES THE SIMILARITY IN SYNESTHETIC COLOR?** Huan-Wei Lin, Su-Ling Yeh
212.06, 02:00 pm **THE BRAINNETOME ATLAS OF LANGUAGE** Lingzhong Fan, Jiaojian Wang, Tianzi Jiang

T2-3: COGNITIVE NEUROSCIENCE I
SATURDAY, SEPTEMBER 2, 01:00 PM – 02:30 PM, ARCHIMEDES ROOM

213.01, 01:00 pm **NEURAL MECHANISMS FOR DYNAMIC AUDITORY PROCESSING: FROM SENSORY PREDICTION TO MOTOR COORDINATION** Andrew Chang, Dan Bosnyak, Jennifer Chan, Yao-Chuen Li, John Cairney, Laurel J. Trainor
213.02, 01:15 pm **BRAIN FMRI OF THE PERCEPTION OF MANDARIN TONES** Andrew C.-J. Hung, Raung-Fu Chung, Chun-Yu Lin
213.03, 01:30 pm **ELECTROPHYSIOLOGICAL INVESTIGATION OF CROSS-LANGUAGE TRANSLATION AND MORPHOLOGICAL PRIMING IN DIFFERENT SCRIPTS** Myung-Kwan Park, Wonil Chung, Say Young Kim
213.05, 01:45 pm **LEFT TEMPORAL (T5) INSTANTANEOUS AMPLITUDE AND FREQUENCY OSCILLATIONS CORRELATED**

WITH ACCESS AND PHENOMENAL CONSCIOUSNESS Vitor Pereira
213.06, 02:00 pm **ASSESSING STUDENT'S SCIENTIFIC CONCEPT LEARNING OUTCOME VIA EEG ANALYSIS** Wenming Zheng

T2-4: COGNITIVE DEVELOPMENT
SATURDAY, SEPTEMBER 2, 01:00 PM – 02:30 PM, Michelangelo ROOM

214.01, 01:00 pm **TAIWANESE YOUNG CHILDREN'S CATEGORIZATION OF RACIALLY AMBIGUOUS FACES: EXPLORING THE EARLY DEVELOPMENT OF CHILDREN'S ESSENTIALIST THINKING** Chun-Man Chen, Sarah Gaither, Sarina Hui-Lin Chien
214.02, 01:15 pm **RELATIONSHIPS AMONG REACTION TIME, REACTION TIME VARIABILITY, AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN PRESCHOOL CHILDREN** Yu-Chi Chen, Shoou-Lian Hwang-Gu, Hsing-Chang Ni, Sophie Hsin-Yi Liang, Hsiang-Yuan Lin, Chiao-Fan Lin, Yu-Han Tseng, Susan Shur-Fen Gau
214.03, 01:30 pm **EFFECTS OF GROUP REMINISCENCE ON COGNITION AND MEMORY IN LATER LIFE: CAN GROUP REMINISCENCE WARD OFF COGNITIVE IMPAIRMENT?** Aya Hosokawa
214.04, 01:45 pm **COMMUNICATION: THE PRIMARY FUNCTION OF NATURAL LANGUAGE** Annie Webster
214.05, 02:00 pm **INTERACTIVE ALIGNMENT: DYNAMIC SOCIAL COORDINATION IN CONVERSATION** Li-chiung Yang
214.06, 02:15 pm **ACTIVATION OF SENSORIMOTOR SYSTEM AND ORIENTAL PAINTING** Lee, Sung-Eun, Eom, Joung-A, Baek, Seung-cheol

T2-5: COGNITIVE NEUROSCIENCE II
SATURDAY, SEPTEMBER 2, 03:00 PM – 04:30 PM, ARCHIMEDES ROOM

215.01, 03:00 pm **THE ROLE OF THE SUPERIOR COLLICULUS IN PUPILLARY RESPONSES TO SALIENCY** Chin-An Wang, Douglas P. Munoz
215.02, 03:15 pm **PROCESSING OF IMMINENT COLLISION INFORMATION IN HUMAN SC AND PULVINAR** Jinyou Zou, Peng Zhang
215.03, 03:30 pm **BRAIN CONNECTIVITY IN RESPONSE INHIBITION FUNCTION WITH JOINT VISUAL AND AUDITORY MODALITIES** Rupesh Kumar Chikara, Li-Wei Ko
215.04, 03:45 pm **A MEG STUDY ON THE BRAIN ACTIVITY IN PROCESSING THE EMOTIONAL EXPRESSIONS** Shih-Tseng T. Huang, Daisy L. Hung, Ovid J.-L. Tzeng
215.05, 04:00 pm **EXECUTIVE CONTROL AND FAITHFULNESS: ONLY LONG-TERM LASTING RELATIONSHIP REQUIRES PREFRONTAL CONTROL** Ryuhei Ueda, Kuniaki Yanagisawa, Hiroshi Ashida, Nobuhito Abe

T3-1: COGNITIVE PSYCHOLOGY
SUNDAY, SEPTEMBER 3, 08:30 AM – 10:00 AM, ARCHIMEDES ROOM

311.01, 08:30 am **RELATION BETWEEN COLOR PERCEPTION AND WRITING MOTION OF GRAPHEME-COLOR SYNESTHESIA** Seiji Oshiro, Hiroki Yamamoto, Jun Saiki
311.02, 08:45 am **DOES "A PICTURE IS WORTH 1000 WORDS" APPLY TO ICONIC CHINESE WORDS?** Shih-Yu Lo, Su-Ling Yeh
311.03, 09:00 am **LATERALITY OF MALE FACIAL ATTRACTIVENESS FOR SHORT- AND LONG-TERM RELATIONSHIP** Matia Okubo, Kenta Ishikawa
311.04, 09:15 am **DISGUST OR ANGER? GET CONFUSED BY THE UPPER PART OF A FACE!** Li-Chuan Hsu, Yu-Pei Ling, Yi-Min Tien, Chia-Yao Lin
311.05, 09:30 am **ELECTROPHYSIOLOGICAL EVIDENCE OF THE FUNCTIONAL SPECIFICITY OF "FOCUS"** Chin Lung Yang, Haihua Pan
311.06, 09:45 am **CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SHOW BOTH CUING EFFECT AND INHIBITION OF RETURN IN THE GAZE CUEING PARADIGM** Li Jingling, Hui-Fang Lin, Chih-Chien Lin, Chia-Jui Tsai

T1-1: COGNITIVE LINGUISTICS

Friday, September 1, 2017, 01:30 – 03:00 PM

Entrenchment and Creativity in Chinese Quadrasyllabic Idiomatic Expressions

Shu-Kai Hsieh[1], Tai-Li Chou[1,2], Chia-Lin Lee[1], I-Wen Su[1], Chia-Rung Lu[1], Te-hsin Liu[3], I-Ni Tsai[3], Benjamin T'sou[4]
[1]Graduate Institute of Linguistics, National Taiwan University, Taipei, Taiwan
[2]Department of Psychology,, National Taiwan University, Taipei, Taiwan
[3]Graduate Program of Teaching Chinese as a Second Language, National Taiwan University, Taipei, Taiwan
[4]Department of Linguistics and Translation, City University of Hongkong, Hong Kong, China

As an idiosyncractic and indispensable part of language, idioms/idiomatic expressions have gained increasing attention. Traditionally, idioms are defined as multi-word units for which the semantic interpretation is not a compositional function of their composing units. The idea of schematicity in idiomatically combining expressions have a different status across linguistic theories. Usage-based accounts (incl. construction grammar, pattern grammar, emergentist and alike) have reasonably shown that idiomatic expressions as pairings of form and meaning are entrenched in a speaker's mind (Croft and Cruse, 2004; Croft, 2012), and the defining properties of them singling them out from other MWEs are their conventionality and metaphoricity. In this paper, we focus on a special type of idiomatic expressions of even length called Quadrasyllabic Idiomatic Expressions (QIEs) in Chinese, and explain their variations with reference to the interaction of construction semantics and exploited ontological knowledge. We select QIEs with symmetric numbers within the construction, which is estimated that they are the most frequent and productive ones, and divide them into idiom-QIE ('chengyu') and prefabs-QIE. 96 Idiom-QIEs and 96 prefabs-QIEs are selected based on the required language resources tailored for Chinese QIEs with suggested lowest level of frequency. We create corresponding pseudo-idiom/prefabs-QIEs with character replacements of different semantic distances to measure the effect on comprehensibility. Corpus evidence and human ratings suggest that the comprehension and processing of nonce QIEs emerges from the interaction of construction and lexical semantics. The result of behavioral experiment shows that semantic distance affects the speed of comprehension with the construction entrenchment. However, for those QIEs with idiomaticity, semantic distance leads to no major effect.We show that Chinese QIEs provide an ideal testing ground for the empirical investigation of the functional linguistic notion of entrenchment in processing multi-morphemic strings. A Pilot study on fMRI experiment also shows some interesting findings.

The Acquisition of the Implicit Syntax of Mass/Count Nominals by L2 Learners of Mandarin Chinese

Panpan Yao
Linguistics, Queen Mary University of London, London, UK

Language acquisition is a challenging issue for late second language learners (L2ers), and it is debatable whether the L2ers could have native-like representations and grammars (Jiang, 2011 vs. Foote, 2011). Very rare research investigates L2ers' real time processing of implicitly acquired knowledge using natural languages. Based on Cheng & Sybesma (1998), the classifier-adjective (Cl-Adj) order is an implicit syntactic cue for the mass/count classifiers in Mandarin. Previous off-line studies (Barner, et al., 2008, 2010, 2012) found that different classifiers can be used to generate mass/count interpretations by native Mandarin speakers. However, it remains unclear whether the Cl-Adj order also contributes to the mass/count distinction, and how native speakers and L2ers make use of this implicit syntactic cue to process NPs in real time. The current study used the Visual World Paradigm (VWP) to look into how native Mandarin speakers and late Dutch-Mandarin learners interpret mass/count NPs with neutral classifiers online, manipulating the Cl-Adj order, and comparing nouns which were judged by native Mandarin speakers as typical count nouns (e.g., spoon) and typical mass nouns (e.g., pebble). The results show that native speakers make rapid use of the Cl-Adj order to generate a 'massified' interpretation and that late L2ers have also acquired and make use of this implicit syntactic cue. Even though late Dutch-Mandarin learners could use the Cl-Adj order as a syntactic cue for 'massified' interpretations, it took them slightly longer than native speakers. Also, L2ers were not sensitive to the semantic difference between different classifiers, or the connections between classifiers and their associated nouns. In general, the current study found that late L2ers have acquired the syntactic cues for mass/count interpretations through implicit learning. However, L2ers require more time and/or information to make use of these cues and are more sensitive to the lexical meanings.

Spatial Language and Cognition across Adult Lifespan: Taiwan as a Test Case

Yen-Ting Lin[1], Hui-Chen Hsiao[2]
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[2]Department of Chinese as a Second Language, National Taiwan Normal University, Taipei, Taiwan

This paper presents an investigation of the nexus between ageing and spatial cognition by examining the use of spatial frames of reference in Taiwanese populations. Existing cognitive neuroscience research typically did not test for possible age factors in preferential reference frame use (Klencklen et al., 2012). It has been suggested that allocentric frames may be more difficult to retrieve from spatial memory subject to normal ageing than egocentric frames based on the results found in

European languages (Antonova et al., 2009; Lithfous et al., 2013; Ruggiero et al., 2016). The test languages exhibit distinct features in spatial reference in small-scale space: TSM speakers shows an allocentric preference, using cardinal directions or external landmarks, while MC speakers show an egocentric preference, projecting the viewer's perspective onto the object. The current study extended the research design of Bohnemeyer et al (2015) to explore the age effect in the use of spatial reference across monolingual and bilingual populations. The research methods comprised a discourse study in a referential communication task and a recall memory experiment (Levinson & Schmitt, 1993). The sample was divided into young (18-30 yrs), middle-aged (31-60 yrs) and senior (61yrs and above) groups. Regression analyses indicated that all three age groups were significantly different from one another in the discourse study and that the senior group and monolingual group had an interaction effect in the recall memory study. This finding suggests that the preferential reference frame is population-specific and advocates the need to examine the language experience of a given population. These studies make valuable contributions to the documentation of variation in spatial cognition in a multilingual context and to understanding the factors driving such variation. By investigating changes in preferred strategies across the lifespan, they also lay crucial groundwork for the study of neural networks involved.

A Comparison of the Role of Top-Down Factors on Local Reading Processes in Braille and Print

Ronan G. Reilly[1], Inthraporn Aranyanak[2], Ralph Radach[3], Christian Vorstius[3]
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[2]Computer Science, King Mongkut Institute of Technology Ladkrabang, Bangkok, Thailand
[3]Psychology, Wuppertal University, Wuppertal, Germany

The purpose of this study was to compare the effects of top-down task demands on low-level information processing in sighted and braille reading. The reading task either required a shallow or deep reading of the text and the aim of the study was to quantify the impact of differential task demands on information pick-up in two radically different reading modalities: sight and touch. Previous studies of sighted reading had shown a dynamic interplay between eye movement control and top-down demands (Radach, Huestegge, & Reilly, 2008). It was an open question whether a similar degree of interactivity held for braille. To study braille readers' behaviour we designed a finger-tracking system utilising affordable components, yet providing high temporal and spatial resolution finger position data (Aranyanak & Reilly, 2012). An SR Research EyeLink 1000 eye tracking system was used to track eye movement in sight readers. The results reveal similar top-down effects on different modalities. Word-viewing times as measured by a range of metrics were significantly shorter for simple verification questions, as opposed to responding to the complex comprehension questions. The more demanding task of answering comprehension questions caused a consistent elevation in the tendency to reread in both tactile and visual reading. Because of the apparent "noisy" nature of hand movements, there is some debate as to the detectabilty of lexical or supra-lexical effects in the finger movements of braille readers (Hughes, Van Gemmert, & Stelmach, 2011). The results described here support the view that braille readers respond dynamically to the demands of the reading task and that these responses are readily detectable by a suitable tracking device. Another of our studies has also shown a similar responsiveness to lexical factors such as word frequency (see Aranyanak & Reilly, 2013).

Acquisition of Chinese Classifiers by Preschoolers with Congenital Hearing Impairment: Influences of Linguistic and Cognitive Factors

Ming Lo[1], Yi-Xiu Lin[1]
[1]Speech and Hearing Science Research Institute, Children's Hearing Foundation, Taipei, Taiwan

This study aimed to examine (1) the acquisition of count-classifiers and mass-classifiers by learners who have limited hearing and verbal comprehension abilities, and (2) whether the acquisition of the two types of classifiers is influenced by the learners' vocabulary size and working memory capacity. A count-classifier (e.g., 朵 /duo3/ in 一朵花 /yi1 duo3 hua1/, a flower) must be used with a noun, which makes vocabulary of nouns a prerequisite for learning the semantic and syntactic characteristics of a count-classifier. A mass-classifier (e.g., 盒 /he2/ in 一盒花 /yi1 he2 hua1/, a box of flowers) is typically a name of an object and can be used without other nouns. However, it takes extra cognitive effort to recognize that the object name can also be used to denote the quantity of the entity named by a noun. Therefore, it was hypothesized that acquisition of count-classifiers is mainly predicted by a learner's noun vocabulary while acquisition of mass-classifiers is affected by not only a learner's vocabulary size but also the learner's working memory capacity.The participants consisted of 40 hearing-impaired preschoolers. They have joined a rehabilitation program adopting auditory-verbal approach, and the number of count-classifiers, mass-classifiers and ordinary nouns that each participant has acquired was calculated. Moreover, the participants were equally divided into two groups according to their working memory spans (high-span vs. low-span).Regression analyses showed that the size of noun vocabulary accounted for acquisition of count-classifiers in both groups of participants (high-span: $p < .05$; low-span: $p < .05$). However, the size of noun vocabulary accounted for acquisition of mass-classifiers in the high-span group ($p < .01$) but not in the low-span group ($p > .10$). The results support the hypothesis and its implications for language acquisition of children with hearing impairment will be discussed at the conference.

T2-1: AI, ROBOTICS AND PHILOSOPHY

Saturday, September 2, 2017, 08:30 – 10:00 am

Nvmsim: A Computer-Aided-Design Tool for Non-Volatile Memory Based Cognitive Computing Hardware

Darsen D. Lu[1], Huai-Kuan Zeng[1], Yi-Ci Wang[1], Fu-Xiang Liang[1]
[1]Institute of Microelectronics, National Cheng Kung University, Tainan, Taiwan

Recently, neuron-like software computational systems have been successfully demonstrated for applications such as computer vision, speech recognition, machine translation, robotics, medical image processing, etc. On the other hand, neuromorphic circuits attempt to mimic the operation and topology of biological cognitive systems in hardware. Neuromorphic circuits, or cognitive computing, will likely be adopted in the near future for these tasks due to the significantly better speed and power efficiency compared to software realization. Computer-aided-design is crucial for realizing neuromorphic systems in hardware due to its complexity. The simulation of neuromorphic circuits must take into account the basic semiconductor device's behavior accurately. At the same time, it must also be carried out over thousands of training cycles in a system containing millions of neurons and synapses. Traditional SPICE circuit simulation tool models device behavior accurately but lacks the capability to handle large neural networks. On the other hand, simulation tools for digital logic is not suitable for neuromorphic systems, which uses analog computation when implemented most efficiently.We have developed NVMLearn, a computer-aided-design tool for neuromorphic circuits. NVMLearn is developed for neuromorphic circuits that utilize non-volatile memory as the basic "synapse" element, which stores information about the significance of each neuron-to-neuron connection. In order to accurately describe non-volatile memory semiconductor device, NVMLearn take in a Verilog-A compact model for the non-volatile memory as input. NVMLearn also takes inputs related to a specific neural network topology, such as how neurons are connected, mathematical functions that describes the propagation of neuron signals, and each neuron's learning behavior. With the new tool, such neuromorphic circuits can be simulated in an efficient manner. It is also able to predict the speed and power consumption of the hardware when implemented.

Inter-Individual Differences in Consciousness Development via a Child-Robot Scenario

Irini Giannopulu[1], Tomio Watanabe[2]
[1]Humanities and Social Sciences, Bond University, Gold Coast, QLD, Australia
[2]Systems Engineering, Okayama Prefectural University, Okayama, Japan

The investigation of consciousness is one of the enigma facing the scientific perspective. There are many theories of what consciousness is. According to one of them, consciousness is defined as the having of perception, feelings and thoughts of the internal and the external world which can be verbal expressed. Multimodal verbal and nonverbal interactions are joined with emotions in a continuous dynamic neuronal complex that constitutes consciousness. Combined cognitive neuroscience and engineering knowledge, we have used a perception-action scenario to analyse conscious processes in association with emotion and oral language in neurotypical children aged 6 and 9 years old. The actor was always a child; the perceiver was a human or a robot. Unconscious emotional expression reflected in physiological data, i.e., heart rate, as well as conscious process mirrored on behavioral data, i.e., number of words and reported feelings, were considered. The results showed that 1) the heart rate was higher for children aged 6 years old than for children aged 9 years old when the InterActor was the robot; 2) the number of words expressed by both age groups was higher when the InterActor was the human. Contrary to children with ASD (Giannopulu et al., 2016), neurotypical children would prefer verbally to interact with humans, as human complex nonverbal and verbal behavior does not constitute an obstacle for them in communication. The present findings would be associated with the development of un/consciousness. Nonverbal behavior expressed by heart rate is an unconscious automatic activity which, in our case, depends on the InterActor Robot. Verbal behavior given by the words pronounced by the children is a conscious activity which depends on Human InterActor. Unconscious and conscious processes would not only depend on natural environments, i.e., humans, but also on artificial environments, i.e., robots.

Surprise and Narrative in an Automatic Narrative Generation Game

Jumpei Ono[1], Takashi Ogata[2]
[1]Graduate school of software and infrmation science, Iwate Prefectural University, Takizawa, Iwate, Japan
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"Automatic Narrative Generation Game (ANGG)" by the authors generates stories through the interaction between two mechanisms: "Game Master (GM)" and "Player (PL)". The main elements of the story are "world setting"and "scene sequence". The former includes characters, objects, locations, times and restricts that define possible ranges in their elements. The main element in each scene is an "event". The story generation is performed using an "Integrated Narrative Generation System (INGS)"developed by the authors.A current focus of this system is to introduce the emotion of "surprise"to propose a function for making more interesting stories to the ANGG. According to Descartes, "surprise" means a strong and temporary emotion with the sudden appearance of an unexpected event. The authors considered that the incremental change by the GM and the PL (in many case, PLs) is partially driven by the PL's function that gives surprise to the GM through the story's

change beyond the GM's expectation. For incorporating the function of surprise into the ANGG, the authors developed a simple story generation mechanism using the INGS, which incrementally changes a story using semantic gap between a first story and a changed story. Further, the authors have confirmed a correspondence relation between the gap and the degree of surprise, and the degree of surprise can adjusted according to the gap. In this paper, the authors present a set of story techniques to make gap and surprise, from a first story by the GM and develop a method for control the use of their story techniques. Surprise based on gap is produced through various types of change of a story regarding a verb, an event, a part of a story and an entire story. Further, the effectiveness of the above two mechanisms will be evaluated by real subjects.

From Theoretical Perceptions of Metalogy to Analyze the Grit and Mindset Theory, A Qualitative Research

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The purpose of this research is to base on theoretical views of Metalogy to analyze the important concepts of the Grit and Mindset theory. This research employs literature analysis from many empirical papers and books about the Grit and Mindset theory. Computer-assisted qualitative data analysis software Nvivo 10 is applied to process and analyze three phases of data. There are three major findings for this research. Firstly, the fixed and growth mindset and the gritty characteristics all conform the Janusian thinking of Metalogy theory. Secondly, the gritty people always not only have bright and growth mindset to success, but creative thinking and meta-thinking of Metalogy maybe the key mediator variables. Thirdly, the three main theoretical views of Metalogy could be explain how the people with the growth mindset and grit to achieve their respective objective.

Hallucination and Phenomenal Presence

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Some significant recent work in philosophy of mind attempts to wrestle anew with what Susanna Schellenberg calls the hallucination question-- how do we explain the phenomenology of hallucinatory experience? Apart from negative disjunctivism, three general approaches have been pursued with a view to answering this question. According to the classical view, in undergoing a hallucinatory experience, a subject S is aware of some kind of particular, mind-dependent mental item or relatum, such as sense data or qualia (Chalmers, Robinson). According to the relational view, S is aware of some kind of extra-mental, mind-independent item or relatum. Candidate examples include external world properties or universals, states of affairs, propositions, or Meinongian objects (Byrne, Dretske, Smith, Tye). Finally, the no-awareness view denies that S stands in an awareness relation to any item or relatum, regardless of whether that item is construed as a mind-independent entity or property or some kind of mental item (Pautz, Schellenberg). I argue against the no-awareness view, offering considerations based on the nature of phenomenal-perceptual judgment for the conclusion that hallucinatory experience does involve an awareness relation to some kind of existing entity. Along the way, I criticize the arguments advanced by Pautz and Schellenberg for the no-awareness view. Then I argue, against the relational view, that the items we are aware of in hallucinatory experience cannot be explained by appeal to mind-independent universals, states of affairs, propositions, or mere intentional objects. In developing this line of thought, I criticize arguments against the relational view set forth by Pautz and Schellenberg, but I go on to argue that the view is nevertheless implausible on phenomenological grounds. This sets the stage for a defense of a particular version of the classical view-- the phenomenology of hallucinatory experience is best explained in terms of one's awareness of phenomenal qualia.

Psycholinguistic Determinants of Object Naming In Thai for a Subset of the Bank of Standardized Stimuli

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Selecting suitable stimuli for investigations into cognitive processes in memory and language is an important process, given the natural variability for words and pictures on many psycholinguistic dimensions (e.g., name agreement, age of acquisition). Normative databases are vitally important and help maintain the necessary level of control over psycholinguistic dimensions when selecting stimuli for experimental purposes. Although norms have been obtained for several different languages, none are currently available for Thai. In the present study, 584 Thai university students provided norms for the 480-item Bank of Standardized Stimuli (BOSS; Brodeur, Dionne-Dostie, Montreuil, & Lepage, 2010), a picture set containing high resolution colour photographic images of common objects. Norms were obtained on seven psycholinguistic dimensions: name agreement, category agreement, image agreement, visual complexity, object familiarity, age of acquisition, and two types of manipulability (ease of grasping & ease of miming).Object naming latencies were also obtained from a separate group of participants (n = 32) on 332 items, after excluding items for low name agreement. The effects of the normative variables on object naming latencies were considered using multiple regression analyses and revealed that age of acquisition, object familiarity, name agreement, and category agreement were the major determinants of object naming

speed in Thai, accounting for around 40% of the variance in naming latency. Age of acquisition and name agreement have also been shown to be robust predictors of picture naming speed in other languages (e.g., Alario et al., 2004; Bakhtiar et al., 2013; Bonin et al., 2004). The interpretation of the observed effects is discussed both cross-culturally and in relation to theories of lexical access during speech production. It is anticipated that the Thai psycholinguistic database, containing both normative data and object naming latencies, will be of interest to researchers working in the fields of cognition, psycholinguistics, and neuropsychology.

T2-2: LANGUAGE PROCESSING

Saturday, September 2, 2017, 01:00 – 02:30 pm

Age of Language Acquisition Influences the Cortical Language Organization in Multilingual Patients Undergoing Awake Brain Mapping

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Objectives. Most knowledge regarding the anatomical organization of multilingualism is based on aphasiology and functional imaging studies. However, the results have still to be validated by the gold standard approach, namely electrical stimulation mapping (ESM) during awake neurosurgical procedures. In this ESM study we describe language representation in a highly specific group of 13 multilinguals, focusing on how age of acquisition may influence the cortical organization of language.Methods. Thirteen highly proficient multilingual patients harboring lesions within the dominant, left hemisphere underwent ESM while being operated on under awake conditions. Demographic and language data were recorded in relation to age of acquisition (native language/early/late acquired languages), neuropsychological pre/postoperative language tests, number and location of language sites, and overlapping distribution in terms of language acquisition time. Analysis included lesion growth pattern/histopathology, location, and size. Results: The functional language-related sites were distributed in the frontal (55%), temporal (29%), and parietal lobes (16%). Of these sites, 38% were located outside the areas predicted by classical models. The total number of native language sites was 47. Early acquired languages (including native) were represented in 97 sites (55 overlapped) and late acquired languages in 70 sites (45 overlapped). The overlapping distribution was 20% for early-early, 71% for early-late, and 9% for late-late acquired languages. Average lesion size was 3.3 cm, comprising five fast and seven slow growing lesions.Conclusions. Cortical language distribution in multilingual patients is not homogeneous, and it is influenced by age of acquisition. Early acquired languages are represented across a larger anatomical region than are those acquired later. The prevalent early acquired languages are largely represented within classical areas. Late acquired languages are less represented and mostly overlapped with the former. A large percentage of cortical, functional language sites are located away from the theoretical anatomical location and are not overlapped.

Bilingual Proficiency in Text Comprehension Processes: Electrophysiological Evidencefrom Reading English as a Second Language Bilinguals

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Psycholinguistic studies that examine the effect of bilingual proficiency have largely focused on the lexical, semantic and syntactic processing whereas those at the text level have received relatively little attention). We conducted an event-related potentials (EPRs) study to examine the proficiency effect on the bilingual processing of text comprehension. Four-eight English as the second language learners (L2/ESL: high vs. low proficiency, 24 each), read two-sentences passages in English where the "referent-matching" relation of the target word ("The explosion.."), to the text matches with the three levels of text representation[1]: A surface-level match as in "…exploded... The explosion…"; a textbase match as in "…blew up... The explosion…"; and a situation-model match as in "…bomb…dropped. The explosion…". Additionally, a non-sensible baseline "…bomb was stored safely… The explosion…" was used to compare the ease of integration processing among conditions. We analyzed the N400 (250-500ms post-target onset) and late positivity component (LPC, 500-700ms) to assess the proficiency effect on the semantic integration [2] and the mental-model construction processes [3,4] respectively. The results indicate robust proficiency effect when processing textbase match: the amplitude of both N400 and LPC was reduced for high-proficient L2/ESL while enhanced for low-proficient L2/ESL. No reliable proficiency effect was observed when integrating the target word with the text relied on a surface-match and a demanding conceptual processing (i.e., inference-drawing when processing the situation match): both groups showed reduced N400 while enhanced LPC effect. The results, overall, underline the importance of the L2 semantic/conceptual processing in modulating the ease of both meaning integration and mental-model construction processes during L2 text comprehension; and also suggest the high resource constraints in bilinguals' mental-model construction processes due to their non-native lexico-semantic processing (as compared to monolinguals [3,5]). References: [1] Kintsch (1998), CambUnivPress; [2] Kutas&Hillyard (1980), Science; [3] Burkhardt (2007), NeuroReport; [4] Brouwer et al. (2012), BrainResearch; [5] Yang et al. (2007), JEP: LMC.

Explanation Type Preference of Action Verb; Social Relations of Arguments

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It has been proposed that the domain of the explanandum (e.g., artifact, animate being) which is specified by the subject of sentence, is the main factor that determines which type of explanation people prefer, mechanistic or teleological. In our previous study (Yoo & Do, 2016), we proposed that the predicate of sentence, i.e., verb type, which describes explanandum's action or state, have greater effect on people's explanation type preference. To examine our hypothesis, we asked participants to generate an explanation after they read a sentence describing either the action of an actor/artifact or the state of an actor/artifact. The domain of the objects to be explained and the properties to be explained (verb type) were factorially combined. Most of the explanations generated for the state verbs were mechanistic explanations, whereas the two types of explanation were about equally generated for the action verbs. The effect of the domain was not significant. However, the social relations of arguments were not controlled in the previous study. Through reanalysis of our 2016 data, we found the possibility that social relations of arguments in the sentence with action verb can yield different patterns of explanation type preference. In the current research, we will propose a new hypothesis that can explain how the social relations of arguments work as the factor which modulates the explanation type preference of action verb.

Grapheme-Color Synesthesia in Chinese Characters: What Determines The Similarity in Synesthetic Color?

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Grapheme-color synesthetes perceive unusual color perception when seeing colorless letters or digits. Previous studies of grapheme-color synesthesia used mostly alphabetic languages, and found certain rule-based linguistic mechanisms related to the perceived synesthetic color. However, whether similar mechanisms exist in logographic languages such as Chinese remain largely unknown. We examined whether meaning and shared radical of Chinese characters influence color mapping of Taiwanese grapheme-color synesthetes. Seven synesthetes with grapheme-color synesthesia of Chinese characters passed the synesthesia consistency test and were included in this study. Three sets of Chinese characters were used to clarify the role of meaning and radical on the color perception of Chinese grapheme-color synesthesia. The first set contained binding words (e.g., "蝴蝶 butterfly", the two characters always appear together), and characters in these binding words tended to have similar colors in all synesthetes. Because the two characters of binding words usually have the same meaning and share common radicals, we further tested the color perception of the synesthetes using the second character sets in which their semantic relationships were defined by semantic association (strong, weak) or categorical relatedness (high, low). However, no clear mapping of semantic and perceived color was found across synesthetes. We then used the third sets of characters, including characters pairs that shared same radicals but with either a transparent or opaque radical in terms of conveying the meaning to the whole character. We found that hue difference was smaller when the two characters had same radicals and the radicals were both transparent, compared to when one character had a transparent radical and the other had an opaque radical. Taken together, our results indicated that both meaning and radical in Chinese characters affect the perceived color of Taiwanese grapheme color synethetes.

The Brainnetome Atlas of Language

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The human brain atlas plays a central role in neuroscience and clinical practice, and is a prerequisite for studying brain networks and cognitive functions at the macroscale. Using non-invasive multimodal neuroimaging techniques, we have designed a connectivity-based parcellation framework to build the human Brainnetome Atlas, which identifies the subdivisions of the entire human brain, revealing the in vivo connectivity profiles. This new brain atlas has the following four features: (A) It establishes a fine-grained brain parcellation scheme for 210 cortical and 36 subcortical regions with a coherent pattern of anatomical connections; (B) It supplies a detailed map of anatomical and functional connections; (C) it decodes brain functions using a meta-analytical approach; and (D) It will be an open resource for researchers to use for the analysis of whole brain parcellations, connections, and functions. The human Brainnetome Atlas could constitute a major breakthrough in the study of human brain atlas and provides the basis for new lines of inquiry about the brain organization and functions. It could be regarded as a start point, which will enable the generation of future brain atlases that are more

finely, defined and that will advance from single anatomical descriptions to an integrated atlas that includes structure, function, and connectivity, along with other potential sources of information. Therefore, with human Brainnetome atlas, we could get some entirely new knowledge on how the brain works. Firstly, we defined a convergent posterior anatomical border for Wernicke's area and indicated that the brain's functional subregions can be identified on the basis of its specific structural and functional connectivity patterns. Secondly, we revealed a detailed parcellation of Broca's region on the basis of heterogeneity in intrinsic brain activity, and investigated cross-cultural consistency and diversity in intrinsic functional organization of Broca's Region.

T2-3: Cognitive Neuroscience I

Saturday, September 2, 2017, 01:00 – 02:30 pm

Neural Mechanisms for Dynamic Auditory Processing: From Sensory Prediction to Motor Coordination

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Humans constantly process highly dynamic, fleeting information, such as in speech and music, in order to understand its meaning. We conducted a series of studies employing EEG and psychophysical techniques to study the neural mechanisms underlying dynamic auditory information processing. The first study presented identical tones in rhythmic versus arrhythmic sequences; occasionally, one tone was replaced by a target tone with modified pitch. We aimed to investigate how pre-target neural oscillatory activity predictively determines post-target perceptual processes. The results showed that the pre-target oscillatory power in beta band (15 – 25 Hz) entrains to the rhythm of the tone sequence, and that the size of this entrainment attenuates the post-target perceptual novelty response and improves behavioural discriminative sensitivity. These results indicate that beta entrainment reflects the prediction of both the pitch and timing of the upcoming tone, leading to improved perceptual processing. In the second study, given that beta oscillation has been viewed as reflecting an auditory-motor cortical communication channel, we further investigated whether the motor system is required for dynamic auditory processing. We recruited typically developing (TD) children and children with motor deficit (probable Developmental Coordination Disorder, pDCD). We hypothesized that children with pDCD should have larger thresholds for auditory temporal discrimination than TD children if the motor system is required for dynamic auditory processing. Children with pDCD did have larger thresholds, confirming this hypothesis. Preliminary ERP results on mismatch negativity (MMN), a neural response reflecting preattentive perceptual encoding of auditory temporal deviation, showed that MMN was only observed among TD children but those with pDCD, suggesting that the motor system is required to processing dynamic auditory information at a preattentive processing stage. Together, our studies show that neural activity reflecting auditory-motor communication predictively facilitates dynamic auditory information processing, and that the motor system is necessary for this process.

Brain FMRI of the Perception of Mandarin Tones

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This research investigated whether the perception of fundamental frequency (F0) contours of Mandarin Chinese tones is associated with the superior temporal gyrus (STG) and the inferior frontal gyrus (IFG) when tones were input from the right ear. The issue was explored with a delayed-match-to-sample paradigm, in which adult native speakers of Mandarin Chinese discriminated between pair-wise tone tokens, and judged whether they were the same or not. In this study two types of auditory stimuli were used: sinewave pitches (SW) and lexical tones (LX). LX refers to tones with, and SW, tones without, vocalic information. We collected the subjects' fMRI (functional magnetic resonance imaging) brain images by using a 3 T MRI scanner, while they performed the auditory discrimination task. fMRI results reveal that LX perception, compared with SW perception, had additional activations at the LIFG and more noticeable activations at the RIFG. The additional activations at the L-IFG imply association with the perception of vocalic information of LX. Despite the differences, SW and LX perception had overlaps of activations at the LSTG and the RIFG. Since SW and LX shared F0 contours, the overlaps indicate that the perception of F0 contours of Mandarin tones is involved with the LSTG and the RIFG in the neural network. The involvement of the LSTG supports the phonemic feature of Mandarin tones. However, solely the left hemisphere of the brain cannot achieve the processing of Mandarin tones.

Electrophysiological Investigation of Cross-Language Translation and Morphological Priming in Different Scripts

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The Revised Hierarchical Model (Kroll & Stewart, 1994) assumes asymmetric lexical links between first language (L1) and second language (L2) (i.e., stronger links from L2 to L1 than those from L1 to L2). Previous behavioral studies supported the model showing significant masked priming effects when the target was L2 and the prime was L1, but not when the prime was L2 and the target was L1 (e.g., Jiang, 1999). However, recent ERP studies provided controversial evidence for either supporting (e.g., Hoshino et al., 2010) or countering (e.g., Midgley et al., 2009) the model. In addition, a previous study showed that cross-language morphological priming effect was found exclusively for cognate words in Spanish-English bilinguals (Duñabeitia et al., 2013). The current study examined if the pattern of cross-language translation priming is consistent with the asymmetric links between L1 and L2 and if it occurs via morphological decomposition, using event-related potentials (ERPs) and a masked priming lexical decision paradigm with unbalanced Korean-English bilinguals. In Experiment 1, targets were Korean (L1) compound word (e.g., 꿀벌, ²kkwupel,² honeybee), and primes were English (L2) words, either 1) translated whole word (honeybee), 2) translated morphemic constituent (bee), or 3) an unrelated word (e.g., ear). Experiment 2 was the same as Experiment 1, except that the targets were in English (L2) and the primes were in Korean (L1). In behavioral results, the translation priming effect and the morphological priming effect were significant only for L1-L2 (Experiment 2), but not for L2-L1 (Experiment 1). In ERP results, the translation priming effect was found only for L1-L2 on the N150, N250, and reduced N400. The morphological priming effect was found both for L1-L2 and L2-L1 on the reduced N400. Taken together, the results suggest that both cross-language translation priming and morphological priming occurs even between different scripts (between noncognate words), and the effects are stronger when L1 primed L2 as compared to when L2 primed L1. In addition, different time-course between translation priming and morphological priming suggests that cross-language morphological decomposition occurs after translation in bilingual readers.

Left Temporal (T5) Instantaneous Amplitude and Frequency Oscillations Correlated with Access and Phenomenal Consciousness

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"Given the hard problem of consciousness (Chalmers 1995) there are no brain left temporal electrophysiological correlates of the subjective experience (the felt quality of redness, the experience of dark and light, the quality of depth in a visual field, the sound of a clarinet, the smell of mothball, bodily sensations from pains to orgasms, mental images that are conjured up internally, the felt quality of emotion, the experience of a stream of conscious thought).However, there are brain left temporal electrophysiological correlates of the subjective experience (Pereira 2015).Notwithstanding, as evoked signal, the change in ERPs phase (frequency is the change in phase over time) is instantaneous, that is, the frequency will transiently be infinite: a transient peak in frequency (positive or negative), if any, is instantaneous in EEG averaging or filtering that the ERPs required and the underlying structure of the ERPs in the frequency domain cannot be accounted, for example, by the Wavelet Transform (WT) or the Fast Fourier Transform (FFT) analysis, because they require that frequency is derived by convolution (frequency are pre-defined and constant over time) rather than by differentiation (without predefining frequency and accounted that frequency may vary over time). However, as I show in the current original research report, one suitable method for analyse the instantaneous change in event-related brain potentials (ERPs) phase and accounted for a transient peak in frequency (positive or negative), if any, in the underlying structure of the ERPs is the Empirical Mode Decomposition (EMD) with post processing (Xie et al. 2014) Ensemble Empirical Mode Decomposition (postEEMD)."

Assessing Student's Scientific Concept Learning Outcome via EEG Analysis

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"Assessing student's scientific concept learning outcome plays a crucial role in science education. Traditional assessment approaches, such as classroom examination, may not objectively reflect whether students have correct understandings of the scientific concept or not in their mind. Motivated by the recent development of brain-based mechanisms on complex casual thinking, we focus our attention on the method of using electroencephalogram (EEG) signal analysis to investigate this problem.
To this end, we firstly build an EEG database recorded from students when they are watching a series of well-designed computer animations, which is based on the scientific concept of Newton's second motion law. Then, we propose a novel EEG spatial filters learning approach for discriminative EEG feature extraction under the Bayes error theoretical framework. Moreover, by incorporating sparse learning technique into the spatial filters learning, we also develop a novel sparse spatial filters learning method for channel selection to improve the EEG classification performance. Based on our EEG database, we conduct extensive experiments to evaluate the effectiveness of the proposed method on assessing student's physical concept learning outcome. The experimental results demonstrate that over 89% classification accuracy could be achieved by the proposed

method."

T2-4: COGNITIVE LINGUISTICS

Saturday, September 2, 2017, 08:30 – 10:00 am

Taiwanese Young Children's Categorization of Racially Ambiguous Faces: Exploring the Early Development of Children's Essentialist Thinking

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Other-race effect (ORE) refers to the observation that people are better at recognizing or memorizing own-race faces than other-race faces. Although the ORE has been reliably demonstrated across ethnicity, biracial faces are rarely explored. In a recent study utilizing Black, White, and biracial ambiguous faces, 4- to 9-year-old White children with non-essentialist thinking could better memorize ambiguous faces than those who employed essentialist thinking. The present study aimed to explore the effect of essentialist thinking on race categorization in Taiwanese children and adults. Sixty 3- to 6- year-old children and thirty adults (mean age= 38 years) performed categorization of biracial-face photos taken from biracial individuals. Two mixed-race conditions were included, Asian (own-race)/White (other-race) biracial faces and Black/White (both other-race) biracial faces. In each mixed-race condition, the child participants performed three tasks: the on-line Categorization Task for 12 racially ambiguous faces, the Crayon Task (to color the skin tone of 4 biracial faces), and the Constancy Task (to determine whether the child employed essentialist thinking or not). The adults performed the on-line Categorization Task only. We found that among the sixty children, about one-third of them employed essentialist thinking on race. For the Asian/White condition, adults and the children with essentialist thinking (N=22) tended to categorize the ambiguous faces as White (other race) ($p < .001$ in adults, $p=.045$ in children), whereas the children with non-essentialist thinking (N=38) categorized the ambiguous faces to White and Asian evenly ($p=.38$). This observation is consistent with the previous study with Caucasian children living in the U.S. For the Black/White condition, adults and children with essentialist thinking and non-essentialist thinking tended to categorize the Black/White ambiguous faces as White. This is a novel finding. In sum, the present study provided cross-cultural evidence exploring the effect of essentialist thinking on children's categorization of racially ambiguous faces.

Relationships among Reaction Time, Reaction Time Variability, and Attention-Deficit/Hyperactivity Disorder in Preschool Children

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Children with Attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) may demonstrate deficits in multiple neuropsychological functions. However, the majority of previous studies relied on single task and mainly focused on school-aged children. The present research recruited 230 preschool children (aged 4–6 years) of whom 83 were at risk for ADHD/ODD and utilized flanker task, day–night Stroop task and K-CPT to measure their responses. We further employed structure equation modeling (SEM) to extract the latent variables among the aforementioned tasks to construct more reliable variables. The results revealed that response inhibition was non-significant between the ADHD risk group and the control group. In contrast, reaction time (RT) and reaction time variability (RTSD) were higher in the ADHD risk group compared to the control. Furthermore, RT and RTSD latent variables were only positively related to inattention behavior; neither was related to impulsivity/hyperactivity behavior, nor ODD. The current study suggests that RT and RTSD might represent core neuropsychological function deficits in preschool children with ADHD and might be useful indexes for the detection of those at risk for ADHD.

Effects of Group Reminiscence on Cognition and Memory in Later Life: Can Group Reminiscence Ward off Cognitive Impairment?

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Multiple factors such as lifetime experience, lifestyle, culture, and history have effects on cognitive aging. It is articulated that we are to maintain or improve our cognitive abilities with sufficient exposure to environments rich in intellectual and social stimuli from the perspectives of the life-span developmental psychology. Reminiscence defined as an evidence-based intervention for the secondary aging could be considered intellectual and social stimuli. The current study investigated effects of group reminiscence session on cognition and memory in later life to test the hypothesis whether exposure to cognitive and social stimuli could ward off the symptoms of cognitive impairment.

Community dwellers in the northeastern city of Japan, aged from 63 to 95 participated in the study. Half of the participants were assigned to receive the intensive intervention, 5 series of bi-weekly group reminiscence session during 10 weeks. After having completed the 10-week group reminiscence session, the group kept on participating in the intermittent reminiscence session. All the participants took cognitive tests including Logical Memory and Verbal Paired Associates from WMS-R, MMSE, and SF-36 before, after, and one year after the intensive reminiscence intervention. The reminiscence group significantly associated more pairs in the subtest from WMS-R in the post-test (M = 21.69, SD = 3.42) than the pre-test (M = 16.63, SD = 4.67) and even maintained their performance in the follow-up test (M = 21.25, SD = 2.49). Moreover, they associated the pairs in fewer trial in the post-test (M = 2.06, SD = 1.29) compared to the pre-test (M = 4.25, SD = 1.69) and even maintained their performance in the follow-up test (M = 2.91, SD = 1.59). The results suggest that the intensive intervention by group reminiscence drew drastic improvement in performance on the memory test while the intermittent intervention contributed to maintaining the improved performance.

Communication: The Primary Function of Natural Language

Annie Jane Webster
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Language is fundamental to humans and provides us with powers that outstrip all other systems of animal communication. We can use it to give instructions or orders, to share information, to speak to ourselves, and to chat about the weather. Philosophers, however, have long been interested in the underlying primary function of Language, one that explains what it is and where it came from. An ongoing debate splits thinkers between the view that Language exists to improve our thinking capacities and the view it exists as a primarily communicative tool. In this paper, I continue this philosophical venture through the lens of cognitive science and defend the view that Language's primary function is indeed communication. Evolutionary theory best explains the existence and primary functions of natural phenomena, and there are two approaches that attempt to explain the existence of Language: as (a) the product or biological evolution and natural selection, or (b) the product of cultural evolution and generational transmission. A rich tradition, known as generative linguistics favours (a), claiming that the syntax of Language is a universal and biological phenomenon. This view, however, argues that communication is only a secondary function of Language. Natural selection tells us that a mutation that promoted the systematic use of symbols would have been selected so that an individual could out-compete —not cooperate with— other individuals. Thus it makes more sense to claim Language was selected a improve our thinking capacities. I argue, however, that there are fundamental intuitions of (b) that generative linguists largely ignore. Humans own further biological traits, such as intention-reading capacities, that appear to make us fundamentally social creatures. I will show that a biological syntax has a vital role in maintaining cooperation, and thus was biologically selected for it's communicative, rather than cognitive, function.

Interactive Alignment: Dynamic Social Coordination in Conversation

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A key goal for participants in language communication is to bring about a mutually shared experience of ideas, event narratives, and emotional responses. This goal is achieved not only through the exchange of lexical meaning, but also through interactive signaling to coordinate information status, expressed in both verbal and nonverbal forms. This study presents our results on prosodic interactive alignment in spoken dialogues, drawing from extended conversational data in both English and Chinese. Because of the multidimensional goals at work in language, alignment is approached as both building social interactional harmony, and also reflecting informational, organizational and expressive processes in conversations. Our results show that synchrony and dissynchrony in prosody occur at both local inter-phrase level pitch level changes, as well as over dialogue sections extending globally across topics and subtopics. The pattern found for our data is that prosodic synchrony is arrived at gradually, with an initial probing stage where topic is negotiated, followed by mixed synchrony and dissynchrony as options are explored or overturned, until speakers arrive at a mutually fulfilling topic theme, where synchrony is frequent. Near conversation end, participants converge in a descending pitch pattern in a shared recognition of the coming conclusion. Detailed analysis of our data further indicates that participant feedback responses are a critical component of cooperative adaptation to new information, and that the complementary distribution of feedback responses helps to bring about the synchronous prosodic patterns associated with convergent speaker states. Our analysis suggests that prosodic synchrony phenomena occur as a mirror of topically and emotionally synchronized participant states and that these convergent and divergent phenomena are not only strategies to encourage rapport, but also act as organizational indicators providing key information on the degree of understanding, on emotional synchrony, and on the perceived status of a mutually fulfilling topic flow.

Activation of Sensorimotor System and Oriental Painting

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Ever since the finding of mirror neuron (Rizzolatti & Craighero, 2004), the activation of sensorimotor system in action observation is pretty much known. Recently, there were studies that proves the activation of sensorimotor system even in viewing art. (Sbriscia-Fioretti, Berchio, Freedberg, Gallese, & Umiltà, 2013; Umilta, Berchio, Sestito, Freedberg, & Gallese, 2012). They thought of the artwork as the visible trace of goal directed movement and showed the activation of sensorimotor system. However, both studies were done with the western artwork and it was necessary to examine the result with the oriental painting. This study aimed to investigate the involvement of the sensorimotor system in oriental painting. The oriental paintings are much influenced by the material characteristic that depends on the amount of water in the brush and dryness of the mulberry paper. Therefore, the final results would be the harmonization between the goal directed movement and the spreadity of the medium. The present study investigated whether the oriental painting would evoke the motor resonance in spite of their material characteristic. Statistical analysis on mu rhythm suppression showed no significant in both original art works and control stimuli. This result assured the weakened artist's creative gesture due to the medium effect influenced on the observer's perception.

T2-5: Cognitive Neuroscience II

Saturday, September 2, 2017, 01:00-02:30PM

The Role of the Superior Colliculus in Pupillary Responses to Saliency

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Pupil size, as a component of orienting, changes rapidly in response to local salient events in the environment. A growing body of evidence suggests that the midbrain superior colliculus (SC) encodes stimuli based upon saliency to coordinate the orienting response. Although the SC is causally involved in the initiation of saccadic eye movements and shifts of attention, its role in coordinating other components of orienting is less understood. Here, we examined how pupil dynamics are modulated by the SC and stimulus saliency. While requiring subjects to maintain central fixation, we presented a salient visual, auditory, or audiovisual stimulus. Transient pupil dilation was elicited after presentation of salient stimuli, and the timing and magnitude of evoked pupillary responses were modulated by stimulus contrast, with significantly faster and larger pupillary responses observed for more salient stimuli. Furthermore, the pupillary responses elicited by audiovisual stimuli were well predicted by a linear summation of each modality response. To establish the role of the SC on this behavior, we electrically stimulated the intermediate SC layers varying stimulation parameters in monkeys trained to perform oculomotor tasks. Transient pupil dilation was elicited by SC microstimulation, and this dilation was qualitatively similar to that evoked after presentation of salient stimuli. If the orienting responses of saccade and pupil size are coordinated through the SC, these two responses should be highly correlated. Varying stimulation parameters systematically modulated evoked saccadic as well as pupillary responses, with trial-by-trial correlation between two responses. Together, our results demonstrated 1) the saliency modulation of pupillary responses, and 2) the SC coordinates pupillary responses and saccades. Because the SC receives convergent signals from multisensory, arousal, cognitive areas, the SC-pupil pathway provides a novel neural substrate underlying not only pupil orienting responses, but also the pupillary modulation by cognitive and arousal processes.

Processing of Imminent Collision Information in Human SC and Pulvinar

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Detecting imminent collision is essential for survival. Recent studies revealed subcortical circuits responding to looming stimulus in rodents. Little is known about how human subcortical visual pathways process collision information. Using fMRI, we studied how the superior colliculus (SC) and pulvinar of thalamus respond to potential collision information. Visual stimuli depicting an incoming ball towards the subject were presented with 3D LED monitors. The incoming ball appeared in one of the four quadrants of visual field. Within each quadrant, the trajectory of incoming ball varied slightly to either hit the center of face, hit the eye, near-miss or miss the head of observers. Subjects responded whether the ball was on a collision course with their head or not. Behavioral results show that subjects performed slightly better detecting collision (hit vs. miss) for stimuli in the upper visual field than in the lower visual field. FMRI data showed that the superficial layers of the SC were sensitive to the looming information from the contralateral visual field, especially when the looming object came from the upper visual field and was on a collision course leading to a direct hit at the center of the subject head. A sub-region in the ventral Pulvinar was also sensitive to the incoming object on a collision course from the contralateral side, showing the strongest response when the incoming object would hit the subjects' contralateral eye (on the same side of the incoming object). These results suggest that human SC and Pulvinar are closely involved in processing incoming objects potentially on a collision course.

Brain Connectivity in Response Inhibition Function with Joint Visual and Auditory Modalities

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Abstract: The response inhibition function related neural signals have arrived from inferior frontal gyrus (IFG) and pre-supplementary motor (preSMA). Response inhibition-related neuronal signals are widespread in the human brain, and there is no specific way to detect their association with other brain regions. Consequently, due to the lack of functional and structural networks across the different brain areas during response inhibition mechanism. We developed a human brain neural network during response inhibition with joint visual and auditory stimuli. The visual and auditory modalities work together to help the identification of a right sources of the events in some circumstances, such as car driving, walking, sport, and shooting. Therefore, to measure the human brain activities changes with visual and auditory modalities in laboratory settings, we performed an auditory stop signal presentation followed by left- and right-hand response inhibition controls. However, the inter-trial coherence (ITC) method was used to evaluate the effect of an auditory modality information processing on visual modality by cortical phase synchrony at frontal, temporal and occipital brain areas. Our results revealed significant phase synchronization in the frequency range of delta (1-4Hz) and theta (4-8Hz) bands at the temporal brain area. Therefore, we suggest this may be a brain signatures of visual event-related response in auditory cortex during left and right-hand response inhibition functions. In addition, strong activation and synchronization were shown in delta (1-4Hz), theta (4-8Hz) and alpha (8-13Hz) bands in the occipital cortex with the visual stimuli. Moreover, in human brain network, highest EEG coherence values were perceived in frontal lobe (F3-F4) compare to other cortices. The higher EEG activation in frontal cortex may be related to response inhibition function. These results delivered new perceptions during the inhibition function of multisensory brain regions with visual and auditory modalities information processing, respectively.

A MEG study on The Brain Activity in Processing the Emotional Expressions

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Twenty adults (10 males and 10 females, age ranged from 19 to 29) with normal or corrected normal vision and reported no abnormal neurological history participated. In the study, faces of seven basic emotions were tested in separate blocks and presented in pairs. The participants were asked to judge if the two faces in each trial were identical as in the same emotion or as from the same person. The results found that the brain activation of identity task were higher than those of the emotion task. The activation of the second faces were higher than those of the first faces. We found a difference in early processes between the emotion and identity tasks. It was found differences in viewing male and female stimuli at 60-83 ms and at BA7, BA18, BA31, BA37, BA10, and Right Cerebrum. The results of 300-500 found higher activation in processing male faces in identity task than in emotion task in BA13 at insular cortex. The findings of the present study suggests an early perception of emotion information which is implemented in phylogenetically ancient brain structures of subcortical nuclei (Tamietto & de Gelder, 2010). The brain activity found primarily in emotion-related area such as insular might be a result of processing emotional components facial expressions.

Executive Control and Faithfulness: Only Long-Term Lasting Relationship Requires Prefrontal Control

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Individuals in the early-stage of the relationship are generally deeply committed to their partners without active self-control. This 'addictive' state in the early-stage, which is supported by the reward system in the brain (Aron et al., 2005), is believed to be suitable for maintenance of such a new relationship (for a review, Fisher et al., 2016). This observation naturally leads to the idea that the prefrontal executive control, which plays a crucial role in maintenance of a monogamous relationship, is less required in individuals in the early-stage of the relationship than those in the long-term lasting relationship. To test this hypothesis, we asked male participants in a romantic relationship to perform go/no-go task during functional magnetic resonance imaging (fMRI) scanning, which is a well-validated task to measure right VLPFC activity implicated in executive control. Subsequently, they were engaged in a date-rating task in which they rated how much they wanted to date unfamiliar females. We found that individuals with higher right VLPFC activity regulated the interest for dates with females better. Importantly, this relationship was found only in the individuals with a long-term partner. Our findings extend previous findings of executive control in maintenance of the monogamous relationship by

highlighting the role of VLPFC which varies according to the stage of the romantic relationship.

T3-1: Cognitive Psychology

Sunday, September 3, 2017, 08:30-10:00AM

Relation between Color Perception and Writing Motion of Grapheme-Color Synesthesia

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"Most previous studies on grapheme-color synesthesia have focused on reading and visual perception of letters. There is no study investigating writing motion of grapheme-color synesthetes. We carried out two experiments to examine the relationship between color perception and action with synesthetes.First, we asked grapheme-color synesthetes whether they experienced synesthetic colors when they were writing. However there was no subjective report saying that they experienced synesthetic colors.Next, we hypothesized that the character shape can be affected by the pen color that is incongruent with its synesthetic color when they are writing. We asked synesthetes to do a Stroop-like task, in which they wrote a Japanese character on a tablet repeatedly and rapidly with a particular pen color. To capture the effect of synesthetic color on writing, we utilized “a slip of the pen” phenomenon, an error in which a person writes some unintended characters when s/he wrote one character repeatedly and rapidly (Japanese characters are easy to slip). We compared conditions in which the pen color is congruent and incongruent with the characters’ synesthetic color, in addition to the condition with black pen color.The results showed a significant difference in the number of slips between the congruent and incongruent conditions with synesthetes while no such difference was observed with control participants without synesthesia, suggesting that the pen color affects the slips of the pen in synesthesia. According to ATS model that explains the mechanisms of skilled action and action slip by D. Norman, this result suggests that the color of the pen interferes with the writing motion of grapheme-color synesthetes. Furthermore it is possible that the influence of the strong grapheme-color ties in syneshetes extends not only within visual perception but also to motor control.

Does “A Picture is Worth 1000 Words” Apply to Iconic Chinese Words?

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The meaning of a picture can be extracted rapidly, but the form-to-meaning relationship is less obvious for printed words. In contrast to English words that follow grapheme-to-phoneme correspondence rule, the iconic nature of Chinese words might predispose them to link their orthographic representations to semantic representations more directly. In our previous work, we examined whether Chinese readers access word meanings directly just like pictures when reading Chinese words, by the repetition blindness (RB) paradigm. RB refers to the phenomenon of lower accuracy of target identification when the target is preceded by a repeated/similar item than an unrepeated/dissimilar one, and the occurrence of RB indicates that two repeated items share the same representations (Kanwisher, 1987). Our previous work demonstrated a series of experiments where little or no RB was found for Chinese synonyms, while robust RB was found for identical Chinese characters, supporting the assertion that Chinese words do not access their semantic representations directly. In this presentation, we provide an additional experiment where an RB effect was manifested for two semantically related pictures. Taken together, two semantically related pictures look very similar so they can induce an RB effect, whereas two Chinese synonyms do not look similar enough to induce an RB effect. Given previous studies on English readers have already demonstrated a lack of RB effect for English synonyms, we conclude that Chinese words are not processed more like pictures than English words. Like their English counterparts, Chinese words do not activate their semantic representations as directly as pictures do.

Laterality of Male Facial Attractiveness for Short- And Long-Term Relationship

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Faces can be seen from different angles in the horizontal plane. While women usually look more attractive when showing the right side of the faces, the results were mixed for men: Some studies reported no lateral preference (Zaidel & Fitzgerald, 1994; Zaidel, Chen, & German, 1995) while others reported the left side preference (Dunstan and Lindell, 2012). The former used emotionally neutral faces or did not control emotional expressions while the latter used smiling faces. As the facilitative effect of smiling depends on relationship contexts (i.e., short- vs. long-term relationship), the present study manipulated emotional expressions and relationship contexts and investigated the lateral preferences for male facial attractiveness. Female participants rated attractiveness of male face photographs on a 7-point scale. Half of participants rated male facial attractiveness as a boyfriend going out on a date (short-term relationship) while the other half rated the attractiveness as a marriage partner (long-term relationship). We used a total of 80

photographs, defined by an orthogonal combination of posing orientation (showing the left vs. right side), 2 facial expressions (smiling vs. neutral) and 20 models. Differently from the previous studies, models were rated as more attractive when they showed the right side of the faces than the left side. The right side preference was observed for smiling faces but not for neutral faces. As smiling reduces masculinity and, thus, enhances femininity, it may enhance components of attractiveness, which are typically ascribed to feminized faces such as trustworthiness, warmth and cooperativeness. This would lead to the right side preferences, which are typically observed for female face attractiveness.

Disgust or Anger? Get Confused by the Upper Part of a Face!

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"To recognize an emotional face is dependent on the degree of distinctiveness between emotions. Research shows that children often confuse facial expressions of disgust with anger. In the present study, we aimed to investigate whether the confusion between anger and disgust manifests in adults and why it would occur. In Experiment 1, participants were asked to judge emotional category and intensity of presented expression. We adopted affective priming paradigm in which the presented time of a prime was 33ms and manipulated prime types with various parts of facial expressions in Experiment 2, 3A, and 3B: whole face, upper-half, and lower- half, respectively. Results revealed adult participants were more likely to confuse disgust with anger compared to other emotions (Experiment 1). Angry prime would facilitate participants' performance to judge the disgust target face (Experiment 2). The upper-half angry faces would also enhance participants' performance (Experiment 3A). However, no such priming effect was found in lower-half condition (Experiment 3B). When we increased the presented time of a prime 33ms to 100ms, the priming effect was eliminate (Experiment 4). Collectively, our findings suggest there was confusion between anger and disgust, and that this confusion may be resulted from overlapping the facial features on upper-half faces.

Electrophysiological Evidence of the Functional Specificity of "Focus"

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"Psycholinguistic research on the focus processing has rarely systematically compared effects of different kinds of focus in a single experiment (Lowder & Gordon, 2015). We addressed this issue by examining the real-time processing of different kinds of focus within a single experiment that can expose their relative prominence and real-time interaction, using event-related potentials (ERPs). We tested native Mandarin Chinese speakers in reading comprehension by manipulating the contextually focused information with question-answer pair sentences (Benatar & Clifton, 2014). The context question A (1a-4a) elicits expectancy for the focus status of the grammatical object in the target (answer) sentence B, with "Zhōubīng" to be the focused entity in 1b, the contrastive focus in 2b, the discourse-deemphasized (hence defocused) entity in 3b, and as neutral (wide focus (Cinque, 1993)) in 4b, respectively.

Focus A. Context question B. Target sentence ("Zhōubīng" the target word)
1. Focused a. Guòqiáng dǎ-le shéi ? b. Guòqiáng dǎ-lé Zhōubīng, dànshì bú zhóng。
2. Contrastive a. Guòqiáng dǎ-le Zǐjiàn ? b. Guòqiáng dǎ-lé Zhōubīng, dànshì bú zhóng。
3. Defocused a. Shéi dǎ-le Zhōubīng ? b. Guòqiáng dǎ-lé Zhōubīng, dànshì bú zhóng。
4. Neutral a. Fāshēng-le shěnme shì ? b. Guòqiáng dǎ-lé Zhōubīng, dànshì bú zhóng。

The results, overall, demonstrated neurophysiological evidence (a broadly distributed sustained negative shift from 200 to 800ms) that corroborates the hypothesis that different focus types are associated with different underlying mechanisms (Benatar & Clifton, 2014), with the contrastive distributed over the central site (bi-lateralized and midline), the neutral negativity distributed over the anterior sites (bi-lateralized and midline), and the defocused negativity distributed over the midline sites. We will discuss the results in the context of the theories of informational status that draws a four-fold distinction among the types of informational categories in language processing.

Benatar, A., & Clifton, C., Jr. (2014). Newness, givenness and discourse updating: Evidence from eye movements. Journal of Memory and Language, 71, 1–16.
Cinque, G. (1993). A null theory of phrase and compound stress. Linguistic Inquiry, 18, 239–297.
Lowder, M. W., & Gordon, P. C. (2015). Focus takes time: Structural effects on reading. Psychonomic Bulletin & Review, 22, 1733-1738.

Children with Attention-Deficit/Hyperactivity Disorder Show both Cuing Effect and Inhibition of Return in the Gaze Cueing Paradigm

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Children with attention deficit hyperactivity disorder (ADHD) usually have social problems, which might relate to their social-attention deficits. Previous studies showed that children with ADHD did not spontaneously pay attention to the directions of another person's gaze. However, social attention continuously develops at school age in typically developed children. This study aimed to further explore how social attention varies with ages for children with ADHD. We measure the effect of gaze cues at age 6-8, 9–12 and 13–15 years old, each group 27 children with ADHD and 27 age-matched typical developed (TD) children. The cue-to-target onset asynchrony was 200 ms or 2400 ms in order to measure the cueing effect and the inhibition of return respectively. The results showed that in general, a cuing effect in 200 ms and inhibition of return in 2400 ms was observed for children with ADHD. Nevertheless, 6-8 years old TD children showed cueing effect in 2400 ms while children with ADHD did not. Our findings suggest that at short duration children with ADHD did not showed deficits in social attention. Nevertheless, at 6-8 years old children with ADHD lack of continues interests to other's gaze as TD children. We argue that the impulsivity and easily distracted behavior of children of ADHD may abolish such prolonged interests to others' gaze. Our study also provides evidence of the need of social interaction training for young children with ADHD.

P1-1: COGNITION, CULTURE, DEVELOPMENT, AND EDUCATION
FRIDAY, SEPTEMBER 1, 01:30 PM – 05:00 PM, PLATO ROOM

121.01 **DEVELOPING THE FIFTH CORE KNOWLEDGE: EXPLORING THE RACE-BASED SOCIAL PREFERENCES IN TAIWANESE CHILDREN** Pei-Chun Hsu, En-Yun Hsiung, Sarina Hui-Lin Chien
121.02 **ANALYZING THE MULTIPLICITY OF A STORY IN KABUKI AND DESIGNING ITS NARRATIVE GENERATION** Takashi Ogata
121.03 **HAIKU GENERATION USING APPEARANCE FREQUENCY AND CO-OCCURRENCE OF CONCEPTS AND WORDS** Takuya Itou, Takashi Ogata
121.04 **LEARNING AND TEACHING THROUGH SOCIAL FABRICATION: FROM AN ETHNOGRAPHIC STUDY IN "FABLAB KAMAKURA"** Rie Matsuura, Daisuke Okabe
121.05 **ILL INTENTION IS THE KEY TO TRIGGER THE MORAL ALARM: CULTURAL VARIATIONS IN MORAL JUDGMENTS IN HARM AND PURITY DOMAINS** Li-Ang Chang, Philip Tseng, Timothy Lane
121.06 **DISSOCIATION OF INTENTION AND PERSONAL FORCE IN JUDGMENTS OF MORAL DILEMMA** Li-Ang Chang, Philip Tseng, Timothy Lane
121.07 **ATTITUDE CHANGE OF PROGRAMING LEARNING IN THE SCIENCE EDUCATION CURRICULUM IN ELEMENTARY SCHOOL** Naoko Kuriyama, Takahiro Saito, Hideki Mori, Akinori Nishihara
121.08 **MAKING AGENCIES VISIBLE THROUGH COSTUME MAKING AND ARTIFACTS: AN ETHNOGRAPHIC STUDY OF COSPLAY FANDOM** Daisuke Okabe, Rie Matsuura
121.09 **THE STUDY ABOUT THE HOUSE THAT CONTINUE TO BE ATTRACTIVE FOR A LONG PERIOD OF TIME** Ryota Yanase, Sayaka Hattori, Masahiro Matsuda
121.10 **AN AGENT-BASED MODEL OF INFANTS' LANGUAGE DEVELOPMENT: LEVEL OF CONSCIOUSNESS 1** Helena Hong Gao, Can Guo
121.11 **AN AGENT-BASED MODEL OF INFANTS' LANGUAGE DEVELOPMENT: LEVEL OF CONSCIOUSNESS 2** Helena Hong Gao, Ganwei Fu
121.12 **DOES RHYTHM PERCEPTION MATTER TO DYSLEXIC CHILDREN?** Chun-Han Chiang, Hsiao-Lan Wang, Jarmo Hämäläinen
121.13 **AGE OF ACQUISITION EFFECTS IN A DEVELOPMENTAL MODEL OF READING THROUGHOUT THE LIFESPAN** Ya-Ning Chang, Padraic Monaghan, Stephen Welbourne
121.14 **COMPLEXITY DRIVES SPEECH SOUND DEVELOPMENT: EVIDENCE FROM ARTIFICIAL LANGUAGE TRAINING** Akshay Raj Maggu, Patrick Wong
121.15 **AN ANALYSIS OF STRUCTURAL INVERSION AS A RHETORICAL DEVICE** Yasuhiro Katagiri
121.16 **EVIDENTIAL JUSTIFICATION IN THE NON-FACTIVE VERB 'KNOW' IN KOREAN AND A FEW OTHER LANGUAGES** Chungmin Lee
121.17 **DOES STRESS CONSTRAIN LEXICAL ACCESS IN BILINGUAL SPEAKERS? AN EYE-TRACKING STUDY** Maria Teresa T Martinez-Garcia
121.18 **DOES LANGUAGE SHAPE THOUGHT?: ENGLISH AND MANDARIN SPEAKERS' SEQUENCING OF SIZE** Hsi Wei
121.19 **THE EFFECT OF VISUAL TALKER INFORMATION ON THE PERCEPTION AND REPRESENTATION OF PHONETIC VARIATIONS IN TAIWAN MANDARIN** Yu-Ying Chuang, Janice Fon
121.20 **CHINESE INFANTS' RAPID WORD LEARNING UNDER UNCERTAINTY VIA CROSS-SITUATIONAL STATISTICS** Xu Qinmei, Tao Ye, Zhang Liping
121.21 **ACQUIRING, CONSTRUCTING AND UTILIZING SCRIPTURAL KNOWLEDGE FOR AN INTEGRATED NARRATIVE GENERATION SYSTEM** Tatsuya Arai, Takashi Ogata
121.22 **WHAT EYE-TRACKING CAN(NOT) TELL US ABOUT ARGUMENT STRUCTURE** Yujing Huang, Laine Stranahan, Jesse Snedeker
121.23 **DURATION OF SYLLABLE PRODUCTION MAY NOT BE PART OF SPEECH PLANS: EVIDENCE FROM RESPONSE TO AUDITORY STARTLE** Chenhao Chiu, Greg Vondiziano
121.24 **BILINGUAL PRODUCTION BEHAVIOR BY DELIBERATE CODE-SWITCHING TASKS** Chikage Kameyama
121.25 **EXPLORING EFL TEACHERS' DECISION MAKING: MIND, DISCOURSE AND NARRATIVE** Maristela Silva
121.26 **DO LEARNERS WATCH TEACHERS' MOTION IMAGES INCLUDED IN ONLINE VIDEO MATERIALS? AN EYE-TRACKING STUDY** Daisuke Kishimoto, Hideaki Shimada

121.27 **LANDSCAPE PREFERENCE IN TAIWANESE SCHOOL-AGED CHILDREN** Chien-Kai Chang, Shu-Fei Yang, Li-Chih Ho, Sarina Hui-Lin Chien
121.28 **HOW OUTLINE TOOLS AFFECT LEARNERS' FEELING OF DIFFICULTY IN WRITING COMPOSITION?** Atsuko Tominaga, Mio Tsubakimoto, Atsushi Fujita, Wakako Kashino
121.29 **CLUSTER ANALYSIS OF LEARNERS BASED ON THEIR PERCEPTION OF WRITING** Aids Mio Tsubakimoto, Atsuko Tominaga, Atsushi Fujita, Wakako Kashino

P2-1: COGNITIVE SCIENCE, COGNITION AND VISUALIZATION, COGNITIVE LINGUISTICS, DECISION MAKING

SATURDAY, SEPTEMBER 2, 08:30 AM – 12:00 PM, PLATO ROOM

221.01 **A LOGICAL APPROACH TO GLOBAL READING OF DIAGRAMS** Atsushi Shimojima, Dave Barker-Plummer
221.02 **EFFECTS OF AGING ON THE PERCEPTION OF AUDIOVISUAL SIMULTANEITY: COMPARISONS AMONG YOUNG, MIDDLE-AGED, AND OLDER ADULTS** Chih-Yi Hsia, Yi-Chuan Chen, Su-Ling Yeh, Meng-Tien Wu, Nai-Chi Chen, Pei-Fang Tang
221.03 **PERCEPTION OF AUDIOVISUAL SIMULTANEITY INDEPENDENTLY CONTRIBUTES TO DUAL-TASK GAIT PERFORMANCE IN THE AGING POPULATION** Chih-Yi Hsia, Yi-Chuan Chen, Su-Ling Yeh, Chien-Kuang Tu, Meng-Tien Wu, Nai-Chi Chen, Pei-Fang Tang
221.04 **IMPROVING CREATIVITY BY HIGH VIEWING ANGLES USING VIRTUAL REALITY** Yukiko Nishizaki, Momoyo Nozawa
221.05 **ADVERBIALS WITH ANTONYMOUS MEANINGS IN CORPUS** Siaw-Fong Chung
221.06 **A COGNITIVE LINGUISTIC FRAMEWORK FOR VALIDATING TAIWANESE ENGLISH AS A VERITABLE WORLD ENGLISH** Silvaana Maree Udz
221.07 **APPLYING THE ANALYTIC HIERARCHY PROCESS TO LINGUISTIC ADJECTIVAL MEANING THEORY** Yusuke Sugaya
221.08 **END UP: A SEMANTIC PROSODY ANALYSIS** Siaw-Fong Chung, Suet Ching Soon
221.09 **HIERARCHICAL BAYESIAN MODELING OF CREATIVE PROCESS** Tatsuhiko Kato, Takashi Hashimoto
221.10 **COGNITIVE PROBLEMS IN ELDER: AN INTERVENTION** Muhammad Rafi Alifudin, Valentino Marcel Tahamata, Rosta Rosalina
221.11 **COGNITIVE MOTIVATIONS IN CHINESE/ENGLISH TRANSLATION** Zi-yu Lin
221.12 **MAKING INVISIBLE "TROUBLE" VISIBLE INCREASES ABSTRACTION OF REFERRING EXPRESSIONS** Gregory Mills, Gisela Redeker
221.13 **CHANGES IN TEMPORAL COGNITION AS A MEASURE OF "BODYMIND" CONTAGION BETWEEN DANCERS AND SPECTATORS** Coline Joufflineau, Coralie Vincent, Asaf Bachrach
221.14 **A COMPARISON OF GARDEN PATH SENTENCES AMONG THAI JUNIOR AND SENIOR READERS** Inthraporn Aranyanak, Ronan Reilly
221.15 **EFFECTS OF INTERPERSONAL VERB AND SOCIAL CONTEXT ON CAUSAL ATTRIBUTION** Sang Hee Park, Kyung Soo Do, Kwanghyeon Yoo
221.16 **HOW EMOTIONS MODULATE THE EXPECTATION OF PAIN** Hsin-Yun Tsai, Chun-Yen Chiang, Ming-Tsung Tseng
221.17 **COGNITIVE CONSTRAINTS IN THE APPRECIATION OF ABSTRACT PAINTINGS BY ART BEGINNERS** Yoshifumi Tanaka
221.18 **THE EFFECTS OF SOCIAL-MEDIA MESSAGES INCORPORATED INTO TELEVISION ON TOPIC RETENTION AND CRITICAL JUDGEMENT** Miwa Inuzuka, Mio Tsubakimoto
221.19 **FEELING LIKE THIS IS MINE: PSYCHOLOGICAL OWNERSHIP MEDIATES EFFECTS OF HAPTIC IMAGERY AND EFFECTANCE MOTIVATION ON WILLINGNESS TO PAY** Sayo Iseki, Shinji Kitagami
221.20 **STIMULUS-RESPONSE COMPATIBILITY BETWEEN PHYSICALLY AND PSYCHOLOGICALLY "WARM-COLD" VISUAL STIMULI AND HAND TEMPERATURE** Hidetoshi Kanaya, Yukiko Nishizaki, Masayoshi Nagai
221.21 **DO DISCRIMINATION TASKS PRODUCE INHIBITION OF RETURN FOR GAZE CUES?** Syuan-Rong Chen, Li Jingling
221.22 **HEMODYNAMIC RESPONSE OBSERVATION DURING MOTOR CONCEPT TASK USING NIRS-IMAGING** Nao Tatsumi
221.23 **THE DRESS PHENOMENON ACCOUNTED BY INDIVIDUAL DIFFERENCES IN SPATIAL CONTEXT PROCESSING** Yu-Hsien Wang, Chia-Ching Wu, Chien-Chung Chen

221.24 **NEURAL CORRELATES OF UNCONSCIOUS SEMANTIC PRIMING: AN MEG STUDY** Sung-en Chien, Yung-Hao Yang, Shohei Teramoto, Yumie Ono, Su-Ling Yeh
221.26 **IN SEARCH OF POINT OF NO RETURN IN PREPOTENT ACTION** Trung Nguyen, Che-Yi, Wei-Kuang Liang, Neil G Muggleton, Chi-Hung Juan
221.27 **THE EFFECT OF STOCHASTIC ENDOWMENT ON RISKY CHOICE** Szu-Yi Chang, Chun-I Yeh, Shih-Wei Wu
221.28 **THE MODULATION EFFECT OF SIGNIFICANT OTHERS' ATTITUDES ON ONE'S SHOPPING DECISIONS** Chiu-Yueh Chen, Chun-Chia Kung

P2-2: COGNITIVE PSYCHOLOGY, CONSCIOUSNESS, ERGONOMICS, HUMAN INTELLIGENCE, LEARNING TECHNOLOGY

SATURDAY, SEPTEMBER 2, 01:00 PM – 16:30 PM, PLATO ROOM

222.01 **THE IMPACT OF STATE ANXIETY ON THE ACCURACY OF RETROSPECTIVE METAMEMORY MONITORING** Yue Li, Meishan Ai, Jinxiu Yin
222.02 **WORKING MEMORY MAINTENANCE OF FACE IDENTITY IS INTERFERED BY FACIAL EXPRESSIONS: AN ERP STUDY** Chaoxiong Ye, Qianru Xu, Piia Astikainen, Qiang Liu, Tapani Ristaniemi, Pertti Saariluoma
222.03 **COMPREHENSION OF THE INTERROGATIVE WORD SHENME 'WHAT' IN MANDARIN CHINESE** Kunyu Xu, Denise H. Wu
222.04 **BINAURAL LOCALIZATION OF MUSICAL PITCH USING INTERAURAL TIME DIFFERENCES IN CONGENITAL AMUSIA** I-Hui Hsieh, Chen-Ssu Chen
222.05 **LONG-TERM LEARNING EFFECT ON AUDIO-VISUAL PROCESSING OF CHINESE CHARACTERS AND SPEECH SOUNDS** Weiyong Xu, Orsolya Kolozsvari, Jarmo Hämäläinen
222.06 **EFFECTS OF COMMONALITY SEARCH TRAINING ON CREATIVE IDEA GENERATION: EXAMINING THE RELATIONSHIP BETWEEN QUANTITY AND QUALITY OF GENERATED IDEAS** Mayu Yamakawa, Sachiko Kiyokawa
222.07 **EFFECTS OF RECALLING "BITTER" EXPERIENCES ON TASTE PREFERENCE** Yukiko Ohmori, Sachiko Kiyokawa
222.08 **DOES READING OPPOSING VIEWS OF INFORMATION IN DIFFERENT ORDERS AFFECT COMPREHENSION PROCESSES – COMPARISONS OF COLLEGE STUDENT PERFORMANCE AND COGNITIVE MODELING FROM THE LANDSCAPE MODEL** Yuhtsuen Tzeng, Chi-Shun Lien, Jyun-Yan Huang
222.09 **WORKING MEMORY CAPACITY MODERATES THE EFFECT OF SYNTACTIC AMBIGUITY ON MIND WANDERING AND EYE-MOVEMENTS** Li-Hao Yeh, Yu-Sheng Cheng, Tai-An Kuo
222.10 **CUMULATIVE IMPACT OF TRAIT MINDFULNESS AND TRAIT ANXIETY ON EXECUTIVE FUNCTIONS** Satish Jaiswal, Shao-Yang Tsai, Chi-Hung Juan, Neil G. Muggleton, Wei-Kuang Liang
222.11 **LONG-TERM MEMORY FOR MOVING STIMULI** Megumi Nishiyama
222.12 **MEAN SIZE ESTIMATION YIELDS LEFT-SIDE BIAS: ROLE OF ATTENTION ON PERCEPTUAL AVERAGING** Kuei-An Li, Su-Ling Yeh
222.13 **CHARACTERIZING THE IMPACT OF AGING ON IMPLICIT INHIBITION** Tzu-Ling Li, Erik Chang
222.14 **CAN THE ORIGIN OF SOCIAL STATUS MODULATE THE PERCEPTION OF FAIRNESS?** Zih Yun Yan, Denise Hsien Wu
222.15 **OBJECT SIZE MODERATE THE MENTAL SIMULATION OF OBJECT ORIENTATION; THE LANGUAGE COULD TOO** Sau-Chin Chen, Bjorn de Koning, Yu-Han Luo, Rolf Zwaan
222.16 **STATISTICAL LEARNING OF NONADJACENT DEPENDENCIES IN SEQUENTIAL AND SIMULTANEOUS VISUAL SHAPES** Yu-Huei Lian, Denise Hsien Wu
222.17 **PASSIVE VIEWING ACTIVATES SELF-REFERENTIAL SYSTEM ASSOCIATING WITH BODY EMBODIMENT** Chiu-Jung Huang, Li-Fen Chen, Yong-Sheng Chen, Jen-Chuen Hsieh
222.18 **WHO IS MORE FLEXIBLE?—AWARENESS OF CHANGING CONTEXT MODULATES INHIBITORY CONTROL IN A PRIMING TASK** Teng, Shan-Chuan, Chao, Hsuan-Fu, Lien, Yunn-Wen
222.19 **ACTION AND PERCEPTION IN AGING: TAKING LENGTH AS AN EXAMPLE** YuYu Huang, Eric Chang
222.20 **FIRST IMPRESSION FROM POSTURES IN DIFFERENT VIEWING ANGLES: EFFECTS ON ATTRACTIVENESS, TRUSTWORTHINESS, AND DOMINANCE** Miho Kitamura, Katsumi Watanabe

222.21 **CAN L2 IMMERSION ENVIRONMENT REVERSE THE NEGATIVE TRANSFER FROM L1? A CASE OF MANDARIN AND TAIWANESE** Wun-Jheng Huang, Li-Chuan Hsu, Kuo-You Huang, Yi-Min Tien

222.22 **THE DIFFERENT LEVEL OF CONSCIOUSNESS IN 3D STEREOPSIS VISION** Yuan, Jy-Chyi

222.23 **EFFICACY OF A LEARNING OPPORTUNITY THAT INCLUDED ACTUAL ACTIVITIES FOR LEARNING TO USE SMARTPHONES AMONG OLDER ADULTS** Satoru Suto, Akemi Ooki, Sumaru Niida

222.24 **GENDER DIFFERENCES IN IMPRESSION EVALUATION OF 3D SHAPES OF LIQUID SOAP BOTTLES** Ryota Miyawaki, Masashi Komori

222.25 **INVESTIGATION OF PILOTS WITH VISUAL INDUCED SPATIAL DISORIENTATION IN THE HELICOPTER SIMULATOR** ChunShen Mu, Wei-Gang Lian, Li-Wei Ko

222.26 **CAN MACHINE REALIZE CREATIVITY THROUGH MANIPULATION OF STRUCTURES? : A LOGICAL CONSTRUCTION OF EXTRACTION AND MANIPULATION OF MUSICAL STRUCTURES USING DEEP LEARNING** Masaya Nakatsuka, Takashi Hashimoto

222.27 **IMPACT OF ONLINE-GAME PLAYERS ON MULTITASKING IN A VIRTUAL ENVIRONMENT** Yun-Hsuan Chang, Shulan Hsieh

222.28 **BEHAVIORAL INTERACTION BETWEEN ELECTRICALLY EVOKED PAIN AND ITCH IN HUMANS** Chun-Yen Chiang, Hsin-Yun Tsai, Ming-Tsung Tseng

222.29 **THERAPIST AND CHILD INTERACTION: NONVERBAL COMMUNICATION IN PEDIATRIC OCCUPATIONAL THERAPY** Chika Nagaoka, Kanae Matsushima, Toshihiro Kato, Sakiko Yoshikawa

P3-1: COGNITIVE NEUROSCIENCE, COGNITIVE PSYCHOLOGY, FUNCTIONAL BRAIN IMAGING, & BRAIN, LEARNING, AND DEVELOPMENT

SUNDAY, SEPTEMBER 3, 08:30 AM – 12:00 PM, PLATO ROOM

321.01 **SCRAMBLED/'FLOATING' NUMERAL CLASSIFIERS IN KOREAN: AN ERP STUDY** Myung-Kwan Park, Wonil Chung, Euiyon Cho

321.02 **BEING AN EXPERT REFLECTED BY STRUCTURAL CONNECTIVITY: A TRACTOGRAPHY STUDY ON MATHEMATICAL EXPERTISE** Ulrike Kuhl, Angela D. Friederici, Hyeon-Ae Jeon

321.03 **SOCIAL INTELLIGENCE IN NEUROPSYCHOLOGICAL CONTEXT** Muhammad Rafi Alifudin, Rosta Rosalina, Valentino Marcel Tahamata

321.04 **INCREASED BRAIN NETWORK EFFICIENCY NOT ALWAYS ENHANCE CREATIVITY: DUAL-PROCESS ACCOUNTS OF HUMAN CONNECTOME AND CREATIVE PROBLEM SOLVING** Ching-Lin Wu, Hsueh-Chih Chen

321.05 **REDUCED LEFTWARD LATERALIZATION OF P600 RESPONSES IN SYNTACTIC CATEGORY PROCESSING IN HEALTHY OLDER ADULTS** Po-Heng Chen, Min-Hsin Chen, Chia-Lin Lee

321.06 **FAMILIAL SINISTRALITY MODULATES THE DEGREE OF LEFT-LATERALIZATION OF THE P600 RESPONSES DURING SYNTACTIC CATEGORY PROCESSING: CROSS-LINGUISTIC EVIDENCE FROM CHINESE** Yi-Lun Weng, Min-Hsin Chen, Chia-Lin Lee

321.07 **LINKING WHITE MATTER INTEGRITY TO HEMISPHERIC PROCESSING OF SYNTACTIC CATEGORY INFORMATION - AN ERP AND DTI STUDY** Wan-Ting Lin, Min-Hsin Chen, Joshua Oon Soo Goh, Chia-Lin Lee

321.08 **BCI LEARNING AND TIME-ON-TASK EFFECT ON BETA REBOUND PHENOMENON** M. Nascimben, J.T. King, C.T. Lin

321.09 **AN INTEGRATED APPROACH TOWARD THE UNDERSTANDING OF AFFECTIVE INFLUENCES ON REWARD-BASED DECISION MAKING IN PATIENTS WITH SCHIZOPHRENIA** Hong-Hsiang Liu, Ming-Hsien Hsieh, Yung-Fong Hsu, Wen-Sung Lai

321.10 **AGING EFFECTS ON SALIENT CAPTURE AND PERCEPTUAL GROUPING IN VISUAL SEARCH** Yen-Ting Liu, Sung-Nan Lai, Li Jingling

321.11 **SHARED AND NON-SHARED NEURAL MECHANISMS IN PROCESSING DYNAMIC TRANSFORMATION OF EXPRESSION AND POSE IN FACES: AN FMRI STUDY** Becky Y.-C. Chen, Peter K.-H. Cheng, Varden C.-S. Hung, Gary C.-W. Shyi

321.12 **IS THE NEURAL INVERSION EFFECT IN HUMAN FFA A RELIABLE INDEX OF FACE PROCESSING?** Liu Kuo, Chiu-Yueh Chen, Chun-Chia Kung

321.13 **ASYMMETRIC CORTICAL ACTIVITY PATTERN FOR AUDITORY MISMATCH**

NEGATIVITY RESPONSE IN PATIENTS WITH SCHIZOPHRENIA Yumie Ono, Masaya Miyazaki, Shohei Teramoto, Yi-Ting Lin, Hung-Hsiang Liu, Ming-Hsien Hsieh

321.14 **PERFORMANCE IN THE DELAYED COLOR-ESTIMATION TASK IS CORRELATED WITH ALPHA AND BETA-BAND ACTIVITY ACROSS THE WHOLE BRAIN** Wen-Sheng Chang, Dong-Han Li, Wei-Kuang Liang, Chi-Hung Juan

321.15 **PERCEPTUAL EXPERTISE PREDICTS BOTH GRAY MATTER THICKNESS AND DENSITY IN THE HUMAN FUSIFORM GYRUS: A CROSS-COUNTRY MRI STUDY ON BIRD EXPERTS** Yi Lin, Chun-Chia Kung, Nian-Ting Yang

321.16 **THE ANALYSIS AND COMPARSION OF CORTICAL THICKNESS AND BRAIN VOLUME: MUSICIANS AND NONMUSICIANS AS CASE** Nian-Ting Yang, Chun-Chia Kung

321.17 **MODULATION OF EARLY EMOTIONAL PROCESSING BY MENSTRUAL PAIN IN PRIMARY DYSMENORRHEA: AN MEG STUDY** Intan Low, Wei-Chi Li, Hsiang-Tai Chao, Jen-Chuen Hsieh, Li-Fen Chen

321.18 **THETA ACTIVITY AT PAIN-FREE STATE IS ASSOCIATED WITH SELF-REPORT PAIN SCALE IN PDM** Pin-Shiuan Lee, Yong-Sheng Chen, Cheng-Hao Tu, Hsiang-Tai Chao, Intan Low, Jen-Chuen Hsieh, Li-Fen Chen

321.19 **AN ERP STUDY OF THE RETRIEVAL ORIENTATION OF NEUTRAL PICTURES EMBEDDED IN EMOTIONAL CONTEXTS** Shih-kuen Cheng, Sze-Ti Line

321.20 **AN EEG ANALYTIC FRAMEWORK OF DETECTING CHOICES IN MANUAL MOTOR IMAGERY AND ITS POTENTIAL APPLICATION IN BIDIRECTIONAL INFORMATION SHARING BETWEEN HUMAN AND MACHINE** Satyasambit Rath, Erik Chang, Shih-Kuen Cheng, Jeng-Ren Duann

321.21 **INVESTIGATING VOCAL EMOTION BY GRAPH THEORETICAL ANALYSIS AND LOBE-DEPENDENT CONVOLUTIONAL NEURAL NETWORK ON FUNCTIONAL MRI** Shih-Yen Lin, Ya-Tse Wu, Chen-Pei Lin, Li-Wei Kuo, Chi-Chun Lee

321.22 **NEURAL CORRELATES OF SEMANTIC PRIMING OF CROWDED WORDS: AN fMRI STUDY** Shuo-Heng Li, Yung-Hao Yang, Tai-Li Chou, Su-Ling Yeh

321.23 **THE N170 AND P3 IN DISCRIMINATING FACES ALONG THE MORPHED CONTINUUM OF HAPPY AND FEARFUL EXPRESSIONS** Shih-Tseng T. Huang

321.24 **IMPACT OF PUTAMEN LESIONS ON TASK CONTEXT UPDATING: EVIDENCE FROM P300 BRAIN WAVES** Yi-Min Tien, Li-Chuan Hsu, Sui-Foon Lo, Chia-Yao Lin

321.25 **RESOURCE-BASED APPROACH TO MUSIC PSYCHOLOGY** Nickolay A.Almayev, Yulia V. Bessonova, Stanislav A. Skorik, Alexey A. Medincev

321.26 **SYNESTHETIC EXPERIENCE INFLUENCE ON DETERMINATION OF SYNESTHETIC COLORS IN GRAPHEME–COLOR SYNESTHESIA** Daisuke Hamada, Hiroki Yamamoto, Jun Saiki

321.27 **HOLDING HEAVY BAGS IN HANDS IMPROVES MENTAL ROTATION PERFORMANCE IN FEMALES BUT NOT IN MALES** Hiroyuki Muto, Soyogu Matsushita, Kazunori Morikawa

321.28 **THE PSYCHOLOGICAL AND NEURAL MECHANISMS OF SEMANTIC REPRESENTATION: A COMPARATIVE STUDY OF GLM AND SEARCHLIGHT ANALYSIS OF THE DIFFERENT RESPONSES BETWEEN CHINESE FICTIVE MOTION AND TEXTURE METAPHOR SENTENCES** Yi-Ping Chen, Tzuyu Tsai, Chunchia Kung, Shuping Gong

321.29 **THE EFFECT OF TRAINING PARADIGM IN GREEBLE EXPERTISE ACQUISITION: A MULTI-VOXEL PATTERN ANALYSIS (MVPA) APPROACH** Han-Shin Jo, Kuo Liu, Chiu-Yueh Chen, Chun-Chia Kung

321.30 **USING MEG TO IDENTIFY THE NEURAL CORRELATES OF RECOLLECTION- AND FAMILIARITY-BASED RECOGNITION IN A SOURCE MEMORY TASK** Nai-Feng Chen, Shih-kuen Cheng

321.31 **ACUTE EXERCISE MODULATES AMYGDALA REACTIVITY TO EMOTIONAL PROCESSING** Yu-Chun Chen, Chenyi Chen, Yawei Cheng

P1-1: Cognition, Culture, Development, and Education

Friday, September 1, 2017, 01:30 – 05:00PM

Developing the Fifth Core Knowledge: Exploring the Race-Based Social Preferences in Taiwanese Children

Pei-Chun Hsu[1], En-Yun Hsiung[2,3], Sarina Hui-Lin Chien[1,2]
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[2]Graduate Institute of Biomedical Sciences, China Medical University, Taichung, Taiwan
[3]Department of Pharmacy, China Medical University, Taichung, Taiwan

In developing the fifth core knowledge about social partners, race is an important factor biasing children to form social affiliations. The present study explored the development of the race-based social preferences in 3- to 8-year-old Taiwanese children. In Experiment 1, twenty-three 3-4 year-old children viewed three simultaneously presented video clips modeled by a Taiwanese (own race, in-group, high social status), a Southeast Asian (near race, out-group, low social status) and a Caucasian (other race, out-group, high social status) young female smiling at them. Children were instructed to give a toy to their most preferred and their second preferred individuals. Results showed that children preferred to give toys to the Taiwanese actress the most (50%), and there is no difference among the three ethnicities for the least preference. In Experiment 2, twenty-two 5-6 year-old children viewed the same videos and were instructed to choose their most preferred and their second preferred persons as friends. The 5-6 year-olds preferred the Taiwanese actress the most (69%), while both the Caucasian (54%) and the Southeast Asian actresses (43%) were the least preferred. In Experiment 3, twenty-one 7-8 year-old children performed the same task as in Exp.2 and they preferred to choose the Caucasian actress (57%) as friend the most, followed by the Taiwanese actress (38%), and the Southeast Asian actress was the least preferred choice. Combining the results across the three experiments, we found that children preferred the Taiwanese actress the most (53%) and the Southeast Asian actress the least (13%). In sum, our findings suggest that a rudimentary race-based social preference (or prejudice) seems to emerge in the later part of preschool years. These results provide a cross-cultural exploration of when and how Taiwanese children's social judgments may be influenced by race.

Analyzing the Multiplicity of a Story in Kabuki and Designing Its Narrative Generation

Takashi Ogata
Faculty of software and information science, Iwate Prefectural University, Takizawa, Iwate, Japan.

The author has been researching narrative generation, especially design and development of an "Integrated Narrative Generation System (INGS)", which generate story, representation and the other narrative structures. This research is based on the concept of "multiple narrative structures", which treats narrative generation as the synthesis of micro and macro levels. The INGS is for the micro or personal generation. The macro level is performed through a "Geino Information System (GIS)" by the author. The "geino" means performing arts that includes traditional genres such as kabuki in addition to contemporary genres. The GIS has several INGS systems to circularly produce various types of narratives including scenarios, actual performances and life histories of performers.
An important idea is that the GIS multiply stores diverse narrative knowledge to generate diverse narratives dependent on their combinatorial or multiple uses. For example, many narrative stories are created by a kind of inter-textual combination of other stories and episodes. Although the INGS is implemented in an organized system, the GIS is the stage of conceptual design. A current object is to design and develop the GIS. An approach relies on studying kabuki, which is a synthesized drama that incorporates a variety of geino genres, such as dance, noh-kyogen, and ningyo-joururi, into a rich form. The author has analyzed the multiple structures of kabuki regarding fifteen elements including person and story. Knowledge on the analyzed multiplicity in kabuki will be introduced into the INGS and GIS.
In this paper, the author analyzes the multiple structures of a "story" using kabuki works based on Inumaru (2005), who is a kabuki researcher, in the framework of the GIS including the INGSs. In particular, the author analyzes a kabuki story based on the relationship with other stories, genres and characters to design the multiple narrative generation mechanism using the systems."

Haiku Generation Using Appearance Frequency and Co-occurrence of Concepts and Words

Takuya Itou[1], Takashi Ogata[1]
[1]Faculty of software and infrmation science, Iwate Prefectural University, Takizawa, Iwate, Japan,

An "Integrated Narrative Generation System (INGS)" by the authors synthesizes various mechanisms and knowledge to generate narrative conceptual structures and representations. A basic unit of the narrative conceptual structures is a case structure for an event that has a verb concept and noun concepts provided by the conceptual dictionaries. Various levels of concepts, such as difficult and easy concepts to understand, are mixed in a semantic category in the dictionaries. Therefore, the various levels are frequently mixed in an event through a story generation process. Although a method to solve it is to revise and detail the categorization, this is a difficult semantic problem. The authors presented another method using appearance frequency and co-occurrence of concepts to control the selection in event generation. In a previous research, the authors confirmed that the number of appearance frequency and the degree of comprehensibility are basically proportion. Further, the

authors controlled the narrative easiness by the frequency and get concepts having a same degree of comprehensibility. These mechanisms were partially incorporated into the INGS. In addition, each concept uses a corresponding word description in the narrative representation phase. However, diversity of word notation is provided by the word notation dictionaries.
On the other hand, the study of narrative generation from a haiku is a recent issue of the authors. This paper conversely aims to generate haikus using the appearance frequency and co-occurrence of concepts and words. A haiku has three parts. This method basically adjusts selecting a concept in each part using the appearance frequency and deciding a concept sequence from a concept to the next concept according to the co-occurrence. For example, using low frequency and co-occurrence may results in the generation of difficult haikus to understand. This study also shows an evaluation for the diverse combinatorial haiku generation.

Learning and Teaching Through Social Fabrication: From An Ethnographic Study in "Fablab Kamakura"

Rie Matsuura[1], Daisuke Okabe[2]
[1]Graduate School of Media and Governance, Keio University, Kanagawa, Japan
[2]Faculty of Infomatics, Tokyo City University, Kanagawa, Japan.

This paper analyzes the relationship between participation and learning represented in ethnographic case studies of ten informants aged 23-59 participating in a common-based peer production site, the FabLab Kamakura community. Digital-based personal fabrication is a new wave culture of mavens, who are devoted to alternatives to mass production, and are on a mission “to make (almost) anything”. FabLab Kamakura is a valuable venue for exchanging information about, for example, digital tools, Arduino, crafts, textiles, and so on. First we frame this work as an effort to think about their participation and learning using the concept of “wildfire activity theory” (Engeström, 2009) and “legitimate peripheral participation (LPP)” from Lave and Wenger (1991). Then we argue an overview of FabLab culture in Japan and at FabLab Kamakura. Using SCAT methodology (Otani, 2011), we group our findings in two different categories: (1) learning through participation in FabLab Kamakura, (2) the visualization of weak ties and mobility through participation in wildfire activities. We conclude that participants at FabLab Kamakura are producing and designing available artifacts for their lives and works, and in doing so, what they are designing is the physical manifestation of their very thoughts.

Ill Intention is The Key to Trigger the Moral Alarm: Cultural Variations in Moral Judgments in Harm and Purity Domains

Li-Ang Chang, Philip Tseng, Timothy Lane
TMU Research Center for Brain and Consciousness, Taipei Medical University, Taipei, Taiwan.

Whether it is sentencing in the courtroom or our moral judgments toward personal behaviors, research has suggested that the intention of the agent is a critical factor. Most of us do not need to, and do not feel that there is a need to argue why unintended harm is more forgivable than deliberate harm, or why attempted murder deserves more severe punishment than unforeseen accidental deaths. The central role of intention, however, was established solely based on evidence from the harm and care domain, and has recently been questioned whether it is as critical in other moral domains. For example, Young & Saxe (2011) found that when it comes to the purity domain (e.g., sexual behaviors), outcome trumps intention in predicting participants’ moral judgments. Here we used a similar set of moral judgment questionnaires on Taiwanese participants to investigate whether there might be a cultural variation in the way people make moral judgments in the harm and purity domains. Our data showed a main effect of intention and outcome, as well as an interaction between moral domain and intention, where intention weighs more heavily in the harm than the purity domain. However, we did not observe an interaction between outcome and moral domain, therefore outcome was not a particularly powerful predictor over intention in the making of purity-related moral judgments in our Taiwanese sample. Together, our results suggest a similarly-weighted role of intention across two cultures, and a cultural distinction in the relationship between outcome and purity-violation events. Implications on the disgust-hypothesis of moral judgment will also be discussed.

Dissociation of Intention and Personal Force in Judgments of Moral Dilemma

Li-Ang Chang, Philip Tseng, Timothy Lane
TMU Research Center for Brain and Consciousness, Taipei Medical University, Taipei, Taiwan.

The trolley dilemma and its many variations have been used as a tool for investigating people’s moral judgment. People are usually willing to pull the switch and sacrifice one person’s life in order to save five others, but such inclination decreases dramatically when the one person has to be physically pushed down the bridge by the main character (i.e., personal force) in order to stop the train (i.e., victim’s body as a means). This combination between personal force and means-to-an-end has been reported to evoke more “immoral” judgments than when each factor is presented alone, an interaction effect to which Greene and colleagues (2009) suggest is necessary in triggering people’s moral alarm. To test this claim, here we used multiple scenarios that have equally dissociable elements of personal force and means-to-an-end in 300 participants. Our results do not support the notion of a magic interaction between personal force and means-to-an-end. Rather, our data strongly support a central role for intention in formulating moral judgments, which is consistent with many previous studies (Mikhail, 2000; Cushman et al., 2006; Hauser et al., 2007). The effect of personal force, on the other hand,

varies across scenarios and therefore likely plays a less dominant role than intention. We did not observe an interaction between the two. Together, we conclude that intention alone is self-sufficient in triggering the moral alarm, whereas other moral factors such as personal force may be more context-dependent between scenarios or even cultures.

Attitude Change of Programing Learning in the Science Education Curriculum in Elementary School

Naoko Kuriyama[1], Takahiro Saito[2], Hideki Mori[1], Akinori Nishihara[1]
[1]Tokyo Institute of Technology, Tokyo, Meguro-ku, Japan
[2]Osaka University, Osaka, Suita-shi, Japan

Recently, “programing learning” is considered to be very effective to understand causal relations and problem structures and they have the possibility to generate various learning/education outcomes. This study aimed to inspect effects of the programming learning inserted into the context of science education curriculum for elementary school students. 24 children in the 6th grade participated the programing learning exercises to simulate planetary motion as an advanced program in learning an astronomical body and a constellation. Comparison between the results of pre/post questionnaire surveys made clear the followings: (i) the programming learning was effective in the understanding of the solar system, (ii) the number of children who think the programming to be seemed useful increased after the programming learning, and (iii) the children who had a negative attitude to the programming improved their attitude after they had experience of the programming learning exercise. It was found that the programming learning is a methodology that brings effective learning/educative effects even for the elementary school students.

Making Agencies Visible Through Costume Making and Artifacts: An Ethnographic Study of Cosplay Fandom

Daisuke Okabe[1], Rie Matsuura[2]
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[2]Graduate School of Media and Governance, Keio University, Fujisawa, Kanagawa, Japan

This paper analyzes the relationship between agencies and artifacts represented in ethnographic case studies of ten female informants aged 20-25 participating in the cosplay community. Cosplay is a female-dominated niche subculture of extreme fans and mavens, who are devoted to dressing up as characters from manga, games, and anime. “Cosplayers” are highly conscious of quality standards for costumes, makeup, and accessories. Cosplay events and dedicated SNSs for cosplayers are a valuable venue for exchanging information about costume making. First we frame this work as an effort to think about their agencies using the concept of hybrid collective and activity theory. Then we share an overview of cosplay culture in Japan and our methodologies based on interviews and fieldwork. Using SCAT (Otani, 2011) methodology, we group our findings in two different categories: (1) Cosplayers’ agencies and relationships with others mediated by usage of particular artifacts, (2) Cosplayers agencies visualized through socio-artificial scaffolding and collective achievement. We conclude that cosplayers are producing and standardizing available artifacts for their cosplay objects, and in doing so, they are designing their agencies. We consider that the activities like them are one appearance we can observe in the other our mundane communities not apply only to cosplay one. Not only to cosplay, however, we consider that these kinds of activities apply to other mundane communities.

The Study about the House that Continue to Be Attractive for a Long Period of Time.

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"In many advanced countries, housing is a property that passed down from generation to generation. However, the average life span of house in Japan is about 30 years, which is shorter than the other countries. Most of houses have no big problem and trouble.
Since 2009, the spread in long-term high-quality housing is promoted in Japan. The technical development about the structure and equipment is remarkable on the construction field. On the other hand, the housing that have no big problem on structure and equipment is demolished usually in Japan. A building is not always recognized as better long-term assets than a piece of land. In the long run, it is not invested in maintenance in housing sufficiently. Even if housing has a high level technical structure and equipment, the resident of next generation may dislike them, they are destroyed in the near future. The study analyzed about the element of charm in a housing is important to support longevity of housing.The purpose of this study is to reveal the physical and psychological element of house that continue to be attractive for a long period of time. We selected NAGANO City for a target place of research, residential area had house built at various age. For those who studies architecture, the older houses (traditional housing) are preferred. On the other hand, regardless of the major, the older houses were estimated important and valuable. They are invaluable to maintain something of value at NAGANO City. Needless to say, new housing that has a high level technical structure and equipment should be built. We should grasp traditional housing in an area to pass down from generation to generation. Finally, we had better understand the value of area, and attempt to maintain the elements of traditional housing."

An Agent-Based Model of Infants’ Language Development: Level of Consciousness 1

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"Understanding how language is acquired by infants has remained to be a challenging task. Previous attempts have all achieved remarkable results that shed light on future directions in the research of infant language acquisition. However, the dynamics of infant language acquisition is a complex process. This process requires the understanding of innate learning mechanisms within infants (which may be responsible for the actions of imitation and social interaction with their surroundings) and the support for development of consciousness. Following Gao et al. (2013; 2008)'s statements of levels of consciousness for language development as theoretical guidelines, our study examines the mechanisms that generate behaviors at different levels of consciousness and their relations to prominent transitions in infant development. The objective of our study is to apply agent-based modeling (Holland, 1995) in exploring the topic of language development in early infants. The theoretical framework of agent-based model (ABM) proposed by Holland (1995) creates a flexible abstraction of the real world and provides an approach in the general study of complex adaptive systems (CAS). ABMs consist of basic computer algorithm units (agents) which are the central modeling focus points. These agents can be either modular or self-contained. An agent is an identifiable, discrete individual with a set of characteristics or attributes, behaviors, and decision-making capability. In this paper, our emphasis and discussions are on the process of language acquisition for infants under the first level of consciousness, and on the expansions of subsequent agent-based models. Results from simulations show that our approach on using agent-based modeling is fair in reflecting the development of pre-linguistic capabilities for infants with minimal consciousness.

An Agent-Based Model of Infants' Language Development: Level of Consciousness 2

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Infants typically start to produce words that can be perceived as "meaningful" (for instance "ma" or "mama") at the 12th month period from birth. This feature of "meaningful first words" is seen as a significant phenomenon in infant language acquisition. This shows that an infant has managed a transition from the first level of consciousness (LoC 1, Minimal Consciousness) to the second level of consciousness (LoC 2, Recursive Consciousness). Most importantly, it also signifies that the infant has thorough development within LoC 2. At this level of consciounsess, infants have developed the capacity to engage informational contents within their memory. Nearing to the 12th month period, infants come about speaking their first words. This emergence of first words is a significant achievement in infant development as this implies that an infant has a thorough development through the stage of LoC 2. Furthermore, this phenomenon sets the basis for infants in learning language. In this paper, we follow Gao et al. (2013; 2008)'s statements of levels of consciousness for language development in discussing the behavioral process and mechanism that could be crucial within LoC 2. In this paper, we aim to focus on the underlying mechanisms within LoC 2 that could allow an infant to make sense of information, whereby leading them to speak their first words.

Does Rhythm Perception Matter to Dyslexic Children?

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"The question of whether children with reading problems have deficits in processing musical rhythms has remained unanswered. However, speech prosody may be one of the most important indicators predicting perception of speech phonemes and the sensitivity of the musical rhythm could contribute to the perception of speech prosody. Also, language and music might share brain mechanisms that could be related to basic auditory processing functions. Even though the debate on the association between music and reading is still controversial, interestingly, the relationship between rhythmic signals and phonological cues might be a factor affecting individual's reading abilities through processing of linguistic prosody. 16 typically developmental children and 16 children with developmental dyslexia were recruited with informed consent in this magnetoencephalographic (MEG) study. Oddball paradigm was adapted for testing the brain responses that were activated by the omissions of the strong or weak beats in the regular rhythmic patterns. The result showed that mismatch negativity (MMNm) and P3a(m) were generated via the irregular patterns of omitted strong beats; however, this effect was only found in the typically reading group but not in the dyslexic group. For between group comparison, there was no significant differential effect in regular rhythms (without omissions), rhythm violations by omitting weak beats, or control rhythms, but there was a significant group effect in irregular patterns produced by omitting strong beats. The results showed that the brain responses to detect irregular rhythmic pattern were larger in typically developing children than in dyslexic children. This study emphasizes the relationship between language and music perception that is in line with the previous studies. Furthermore, at the level of event-related fields, dyslexic children did not differentiate the different rhythmic patterns from each other. This study has showed that dyslexic children have differential neural processing of rhythms that could be one

of the underlying factors in dysfluent in reading development."

Age of Acquisition Effects in a Developmental Model of Reading throughout the Lifespan

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Cognitive development is a trajectory shaped by interactivity between architectural constraints and environmental experience of the developing brain (Westermann et al. 2007). In the domain of language processing, early experience has a long-term impact on later processing. One example of this cognitive footprint is the well-documented phenomenon of age of acquisition (AoA). In lexical processing, early-learned words tend to be processed more quickly and accurately relative to later-learned words (e.g. Juhasz, 2005). Two theoretical explanations emphasising different aspects of developmental changes have been proposed. The representation theory (e.g., Brysbaert & Ghyselinck, 2006) argues that the AoA effect could originate from differences in semantic representations where early-learned words have richer semantic representations. Alternatively, the mapping theory (e.g., Ellis & Lambon Ralph, 2000) proposes that gradual reduction in plasticity for learning mappings between representations over the time course of learning is the key to accounting for the AoA effect. Recently, an emerging view has considered that the two theories may both contribute to the AoA effect. However, the relative contribution of representations and of mapping remains unclear. To explore this, we developed a triangle model of reading including a realistic, cumulative exposure to words during learning to read (Monaghan & Ellis, 2010). Regression analyses on the model's reading comprehension performance showed that AoA was a reliable predictor. There was a significant interaction between AoA and concreteness, suggesting that AoA operates differentially on concrete and abstract words. Additional analyses of the locus of the effects in the model revealed that the concreteness effect was related to semantic properties of representations, but that AoA was related more to the mappings than to the representations. The model supports the view that changes in both plasticity and representation contribute to the emergence of the AoA effect.

Complexity Drives Speech Sound Development: Evidence from Artificial Language Training

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Speech sound acquisition is fundamental to spoken language acquisition and is a subject of theoretical debates. The traditional perspectives (e.g., behaviorist theories, scaffolding theory, connectionist view, and dynamic systems theory) suggest that simple input is more important for speech sound acquisition, whereas complexity-based linguistic theories postulate that complex input (Gierut et al., 1987; Gierut et al., 1996) plays a more important role. In the current study, we test these competing sets of theories by comparing the effects of training based on simple and complex stimuli. Complexity is defined by the markedness hierarchy. In our training, the more marked pre-voiced dental-retroflex sounds were considered complex whereas the less marked voiceless dental-retroflex sounds were considered simple. Cantonese-speaking adult subjects were trained for five consecutive sessions on a pseudoword-picture identification task. In order to evaluate their improvement (on trained sounds) and generalization (to untrained sounds), subjects were tested on an AX discrimination task before and after the training. We found that the subjects who were trained on complex sounds (n=15) significantly improved on the perception of both complex and simple stimuli. On the other hand, subjects who were trained on simple sounds (n=15) only improved on perception of simple sounds and did not generalize to the untrained complex sounds. The current findings reveal that complex input induces system-wide changes in the phonological system while simple input leads to limited changes in the phonological system. Overall, our findings suggest that complex input plays a more important role in speech sound acquisition relative to simple input.

An Analysis of Structural Inversion as a Rhetorical Device

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Human language understanding is conceived to consist of successive stages of lexical, syntactic and semantic processes. Pragmatic and common sense reasoning are then applied to get to the speaker's intended meaning. Rhetorical devices can be considered as a set of tools at the speaker's disposal to guide the latter pragmatic and common sense reasoning of the hearers. Structural inversion is often employed as a rhetorical device to produce a critical punchline with humorous effects when interpreting a text. Paul Krugman once wrote a paper, which concludes with a sentence: This paper is a serious analysis of a ridiculous subject, which is of course the opposite of what is usual in economics. The word 'opposite' triggers structural inversion to produce as implication a critical and humorous message.
We present an analysis of structural inversion in terms of situation parsing, inversion and allusion.

Evidential Justification in the Non-Factive Verb 'Know' in Korean and A Few Other Languages

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Horn (2014) cites Hintikka's (1962) ambiguity of negating a 'know' clause between factive presupposition [p & ~Kap] and non-factive (NF) [~Kap], adding the NF nonveridical question example like ‘Do you know that he is reliable?’ in English. In contrast, we present a rather unexplored case of the two alternant uses of factive and NF in the positive verb al- 'know' in Korean (K). and similarly bil- in Turkish (T) and tudjia in Hungarian (H). The factive vs. NF distinction is crucially made by the different complement cases of factive ACC vs. NF oblique case (–uro) in K and factive ACC (i) vs. Reportative (diye) in T and similarly definite anaphor vs. oblique anaphor before 'know' in H. Japanese, however, has no NF 'know,' although it has the factive complement case of ACC. The NF (–uro) al- verb is different from other weaker epistemic verbs meaning ‘believe’/‘think’ in that even the NF one tends to require some piece of evidence for JTB (justified, true belief as defined in epistemology), as in T and H. But the evidential justification may turn out to fall short of knowledge, not being true. We conducted experiments to clearly show that the NF (–uro) al- has the relation of neg-raising between the high neg S and the low (complement) neg S, which are truthconditionally equivalent. It implies that this NF verb (–uro) al- is identical in neg-raisability with other weaker epistemic verbs meaning ‘believe’ and ‘think’ in Korean. T and H also reveal neg-raising, as hypothesized. An excerpt from Sejong Corpus indicates that the NF ‘know’ in Korean typically accompanies some piece of evidence that led the speaker to hold a firmer belief than other epistemic verbs meaning ‘believe’/‘think’ in Korean, which can be used with no such evidential justification. T and H also support this characterization of NF 'know' vs. other weaker epistemic attitude verbs. However, the newly discovered commonality of neg-raising between the NF 'know' and the belief type epistemic verbs in all these three languages is the most exciting result we arrived at.

Does Stress Constrain Lexical Access in Bilingual Speakers? An Eye-Tracking Study

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In any linguistic context, the two languages of bilingual listeners are active and interact, such that lexical representations in both languages are activated by the spoken input with which they are compatible. Whereas words that overlap segmentally in the two languages compete for activation, it remains unclear whether suprasegmental information further modulates this cross-language competition.This study investigates the effect of stress placement on the processing of English-Spanish cognates by native Spanish speakers with some knowledge of English (in Spain) and intermediate-to-advanced English-speaking second-language learners of Spanish (in the US) using a visual-world eye-tracking experiment in Spanish. In each trial, participants saw a target (asado), one of two competitors (stress match: asados; stress mismatch: asador), and two unrelated distracters, and they heard the target word. Importantly, the experiment included a non-cognate condition (asado-asados-asador) and a cognate condition, where the stress pattern of the English word corresponding to the Spanish competitor in the stress-mismatch condition (inventor) instead matched that of the Spanish target (invento). Second-language proficiency and vocabulary, and inhibitory control were measured.Growth-curve analyses on competitor fixations reveal cognate-status and stress-mismatch effects for native Spanish speakers, indicating that stress constrains lexical access for these participants, similarly for both cognate conditions. For the Spanish learners, results show a greater effect of stress match in the non-cognate condition than in the cognate condition, and a very early advantage for cognate words in the stress match condition (and to less degree in the stress mismatch condition). Results of this study provide further support on the simultaneous activation of the two languages in the bilingual brain. There is clear evidence showing lexical stress can modulate the degree of cross-language activation that bilingual listeners experience."

Does Language Shape Thought? English and Mandarin Speakers' Sequencing of Size

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Does the language we speak affect the way we think? This question has been discussed for a long time from different aspects. In this article, the issue is examined with an experiment on how speakers of different languages tend to do different sequencing when it comes to sizes of general objects. An essential difference between the usage of English and Mandarin is the way we sequence the sizes of places or objects. In English, when describing the location of something we may say, for example,”The pen is inside the trashcan next to the tree at the park.” In Mandarin, however, we would say, “The pen is at the park next to the tree inside the trashcan.” It’s clear that generally English use the sequence from small to big while Mandarin the opposite. Therefore, the experiment is conducted to test if the difference of the languages affects the speakers’ ability to do the two different sequencing. Within the experiment, three nouns were showed as a group to the subjects. Before they saw the nouns, they would first get an instruction of “big to small”, “small to big”, or “repeat”. Therefore, the subjects had to sequence the following group of nouns as the instruction they get or simply repeat the nouns. After completing every sequencing and repetition in their minds, they push a button as reaction. As the result, the experiment shows that English native speakers react more quickly to the sequencing of “small to big”; on the other hand, Mandarin native speakers react more quickly to the sequence “big to small”. To conclude, this study may be of importance as a support of language relativism that the language we speak do shape the way we think.

The Effect of Visual Talker Information on the Perception and Representation of Phonetic

Variations In Taiwan Mandarin

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Min is a common local substrate language in Taiwan that substantially molds the phonology of the official language Mandarin. Although many of the Min-affected phonetic variants are of fairly high frequency, our previous research shows that lexical retrieval is more efficient when words are presented in its canonical than its variant form, which directly contradicts the frequency effect commonly found in processing studies. As talker information and visual modes are found to be readily incorporated in speech perception, this study intends to investigate the effect of visual talker information on the perception and representation of some Min-dependent Mandarin phonetic variants in Taiwan, in particular, the deretroflexion rule of /tʂ tʂʰ ʂ/→[ts tsʰ s] and the nasal merger of /in/→[iŋ]. Participants will be first presented with face photographs prototypical of Min and non-Min speakers, and will later be asked to perform a lexical decision task on auditory targets phonetically congruent or incongruent with the facial information. It is hypothesized that lexical retrieval will be facilitated when auditory targets of phonetic forms that are congruent with the facial information is presented.

Chinese Infants' Rapid Word Learning Under Uncertainty via Cross-Situational Statistics

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"Recent statistical learning studies of English adults and infants suggest the plausibility of cross-situational word learning in much more complex situations with many words, many possible referents, highly ambiguous individual learning trials, and the statistical resolution of the ambiguities only through the accumulation and evaluation of information over many words-referents pairings and many trials. Our study aims to answer the questions: When can Chinese infants learn new words under uncertainty via cross-situational statistics? Does the strength of words-referents association influence on cross-situational word learning? In the study, during the training phase, on each trial, two word forms and two potential referents were presented with no information about which word went with which referent. Although words-referents pairings were ambiguous within individual trials, they were certain across trials. After training, infants were presented with a single word and two potential referents, the cross-trial correct referent and a foil. The longest looking difference (LLD) means the difference of longest looking time between the correct referent and the foil. If infants have calculated the statistics appropriately, LLD should be above 0 significantly after naming (naming effect). In experiment 1, 18 20-month-olds were taught 4 word-referent pairs. There were 12 trials for training. The strength of words-referents association was 6:2 (co-occurrence times of word-referent: co-occurrence times of word-foil)(low). There was no naming effect found. In experiment 2, 17 20-month-olds were taught 5 word-referent pairs. There were 20 trials for training. The strength of words-referents association was 8:2 (high). The naming effects were found. In experiment 3, 15 16-month-olds learned word-referent with the high strength of association. There was no naming effect. The results indicated that: 1) the strength of association of words-referents affects Chinese infants' cross-situational word learning; 2) only 20-month-old Chinese infants can learn words via the high strength of association (8:2)."

Acquiring, Constructing, and Utilizing Scriptural Knowledge for an Integrated Narrative Generation System

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"This research is related to an "Integrated Narrative Generation System (INGS)" by the authors, which automatically generates narrative conceptual structures (story and plot) and the representations. The INGS uses the knowledge of event sequences for generating a story. The authors call this type of event sequence a script. A script means a semantically organized events used for detailing an episode and extending a scene in a story by the corresponding story technique in the INGS.
In the previous development, scripts have been stored by hand. However, the INGS currently needs many scripts for diverse and flexible story generation. Firstly, a semi-automatic script composition tool has been presented to easily define and store in the script knowledge base in the INGS. Using this tool, the authors define and store 760 scripts, which include events from 3 to 10, based on the description of event sequences inputted by users. The next method experimented by the author is script acquisition from many novels. In the first step, pairs of two verbs were automatically extracted using bigram. For each verb in the pairs, the authors define a case structure referring to an original sentence, in which the verb is included, using the semi-automatic script composition tool.In this paper, the authors aim to automatically insert the values into the case structures for the acquired verbs to effectively prepare scripts. In particular, the method analyzes the grammatical structure of a sentence in which the extracted verb is included and the elements are inserted into the corresponding place in the case structure. Because the completely correct insertion may be difficult to implement, relatively adequate data will be used actually. Further, the authors show that the acquired and constructed scripts can be effectively utilized in the story generation process in the INGS.

What Eye-Tracking Can(not) Tell Us about Argument Structure

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The subject of intransitive verbs can have different thematic roles. For example, in “the boy fell”, “the boy” takes a patient role, while in “the boy smiled”, “the boy” takes an agent role. To preserve a consistent mapping between thematic roles and syntactic position (subject in this case), linguists propose that the subject of some intransitive verbs is underlyingly a syntactic object (the Unaccusative Hypothesis, UH). This generates the prediction that the subject of an unaccusative must be mentally reactivated in its original postverbal position. Previous psycholinguistic studies have reported evidence of reactivation (Friedmann et al 2008, Koring et al 2012). However, these studies did not equate the unaccusative and unergative stimuli for imageability, animacy of the subjects, or sentential context, or visual stimuli, resulting in confounds which jeopardize their conclusions. We reexamined UH with two Visual World Paradigm experiments carefully controlled for all the factors above. On each trial, participants (n=40; n=60) saw 4 black-and-white drawings and heard a sentence. In the test condition, but not the control condition, one image was semantically related to subject of the sentence. We measured the proportion of looks to the target image at three time regions after the verb onset and found a robust match-effect ($p's<.05$) but no differences between the unaccusative and unergative conditions (i.e. no difference in reactivation). By comparing our analyses with the previous analysis, we found that the effect in the previous studies are not stable due to their choice of statistics. We reconsider the prior experimental findings and conclude that the effects in the previous studies are due to the artifacts of confounds or noise in the data. From a methodological point of view, we show that the growth curve model with no transformation of the distribution is not appropriate for analyzing eye-tracking data.

Duration of Syllable Production May Not Be Part of Speech Plans: Evidence from Response to Auditory Startle

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"Startling auditory stimulus (SAS, > 120dB) has been considered as a reliable trigger to a rapid release of prepared responses, including upper limb movements (Valls-Solé et al., 1999; Carlsen et al., 2012) and English consonant-vowel syllable production (Stevenson et al., 2014). The reaction time of the SAS-induced response is argued to be too short to involve feedback correction, suggesting that the rapid release is the result of a prepared program being executed with only limited afferent feedback. Chiu and Gick (2014) extended this startle paradigm to Mandarin syllable production, showing that while startle-elicited responses are released at shorter latencies, phonemic tonal contour and formant profiles are preserved. Both English and Mandarin results reveal that pitch height is elevated in startle-induced responses. However, such pitch elevation is less observed in pitch-trained speakers' responses than in general Mandarin speakers' responses (Chiu, 2017). In order to maintain a required target pitch level, the responses in Chiu (2017) were pre-specified longer than a syllable duration in connected speech. It is not clear whether a SAS may elicit similar effects to responses of different durations. The current study uses the startle paradigm to tackle this question by comparing general Mandarin speakers and Mandarin speakers with pitch training. Participants were instructed to produce a CV syllable of either 0.5, 1, or 3 seconds. Preliminary results show that with pre-specified duration, SAS-induced responses are not triggered at a latency as short as those in syllable responses with no duration specification. Such absence of rapid release is more robust for speakers with pitch training background. Results suggest that responses with specifically long durations may require additional online adjustment and thus may not be elicited as rapidly. A more general implication is that such prosodic information may not necessarily be specified in the speech plan prior to the production.

Bilingual Production Behavior by Deliberate Code-Switching Tasks

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In a conversation, code-switching (CS) is often observed in bilinguals with the same language backgrounds. CS is the phenomenon of bilinguals alternating between two languages in conversations; this unique phenomenon was investigated by observing CS during behavioral experiments. Two sessions were conducted, assessing ten native Japanese subjects with high English proficiency; they performed deliberate CS conversational tasks using Japanese and English. All subjects were Japanese native speakers who were exposed to English after twelve years of age. They are currently using English in their professions. The first session was the task to name the pictures in either language that was the language used for the question. The other session the subjects had to name the pictures that were not the language used for the question. Both Japanese and English question sentences were timed and equalized for length. Pictures were presented immediately after the question sentences and the subjects' response times were analyzed. Additionally, the subjects' answers were analyzed if they were making language errors. The main finding was that their responses in Japanese were more delayed than those delivered in English. This suggests that the subjects' attention to the second language is so cautious and aimed that they slowed down replying in Japanese as though they neglected to pay attention to their native language. Considering BIA+ model (Dijkstra & van Heuven, 2002)

and L2 episodic hypothesis (e.g., Witzel & Forster, 2012), a putative model of late bilingual with high L2 proficiency was attempted to be proposed for CS production.

Exploring EFL Teachers' Decision Making: Mind, Discourse and Narrative

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Teacher cognition has its origins in psychology, in the cognitive studies, but soon it was affecting, and being affected by the research developed in other areas. This influence helped the field become multidisciplinary which included studies on linguistics, anthropology, neuroscience, among others. In simple terms, teacher cognition relates to everything that is in the mind of the teachers, such as their beliefs, attitudes, knowledge, thoughts, and decision making. In the last 25 years, educational research has given meaningful attention to teacher cognition, especially in the teacher education spheres. However, a common question emerges in the literature of the field: the clear identification of the constructs of teacher cognition. They have been usually studied in relation to other constructs and such association help the conceptualization of new meanings which add to the general idea of teacher cognition. Therefore, the understanding of teacher cognition becomes more inclusive and constantly renewed. The research about teacher cognition which grounds this oral presentation follows the socio-cultural theories of Vygotsky and the educational principles of Freire. This research also applies core aspects of narrative enquiry and elements of discourse analysis in order to explore main teacher cognition construct. Having as a basis the model of narrativised teacher cognition, such as decision making, the audience is invited to analyze excerpts of teachers' narratives to find specific constructs and the potential relations between them. In the final discussion, it is expected that the audience find similar ways to the identification of some constructs, as well as their complex interrelations in the teachers' narratives.

Do Learners Watch Teachers' Motion Images Included in Online Video Materials? An Eye-Tracking Study

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Typical online video learning materials such as MOOCs (massive open online courses) often include teachers' motion images concurrently with learning contents such as teachers' speeches and PowerPoint visual slides. Although the teachers' motion images seem to disrupt learning attitude because of depriving learners' attention from the learning contents, why are the images used in many learning videos? We consider teachers' nonverbal signs informed the images essential to learn even in asynchronous online learning as human learning is intrinsically not information-to-learner communication but teacher-to-learner, that is, human-to-human communication. As the first step of verifying the hypothesis, we investigated whether teachers' motion images would divide learners' attention from visual slide contents by eye-tracking.Three types of 4-minute video materials were prepared: motion image, still image, and no image. The typical video learning materials were motion images, which consisted of a visual slide, a teacher's motion image and speech. In the still image materials, the motion images were replaced with the still images of the teacher. In the no image materials, the motion or still images were removed. We requested twelve university students to watch the materials naturally while evaluating their eye-fixations on the images and the slide areas with an eye tracker (Tobii X2-60). The findings show that in the motion image condition the average ratio of fixation frequency on the teacher's image to the visual slide was 23% to 77%, and the ratio on the teacher's image was significantly higher than that in the still image condition (10%). The ratio of total fixation time revealed the same pattern. These results suggest that learners watch teachers' motion images while learning and acquire some information from them to learn effectively and deeply. Our further research aims to verify learning processes from video materials with teachers' images.

Landscape Preference in Taiwanese School-Aged Children

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We are fond of beautiful scenery, but not all types of scenery are equally preferred. Scene types have an enormous effect on the preferences for landscape in Western adult participants. A recent study using visual signal computational model to predict landscape preference discovered that Taiwanese young adults showed a higher preference for natural scenes (coasts, forests, countrysides, mountains views) than urban scenes (highways, tall buildings, streets, inner cities) (Ho et al., 2015). The present study aimed to explore the landscape preference in Taiwanese school-aged children using the same image database. Forty 5- to 12-year-old Taiwanese children participated the study. Each participant received 80 pictures containing four natural scene types (coasts, forests, countrysides, mountains) and four urban scene types (highways, tall buildings, streets, and inner cities), 10 for each type. There were six different sets of 80 pictures from the 480-picture image

database. Each picture was displayed one by one on a touch screen notebook (Asus S551L). The participants were asked to drag each picture to one of the five folders based on their preference: 1) strongly disliked, 2) slightly disliked, 3) neither, 4) slightly liked, and 5) strongly liked. We found that Taiwanese children showed a higher preference for natural scenes (3.812) than urban scenes (3.159, $p < .001$), and their preference of the coast scenes (4.127) was the highest among all types. We also found that, compared to the adults' rating scores in Ho et al. (2015), children tended to rate higher for both natural and urban scenes. In sum, the present study revealed that, like adults, Taiwanese children exhibited a stronger preference for natural scenes than urban scenes, which supports the prospect-refuge theory that natural scenes simultaneously provide abundance and a sense of security to meet human needs.

How Outline Tools Affect Learners' Feeling of Difficulty in Writing Composition?

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We have implemented three outline tools in an academic writing course for the first-year students at a university in Japan, where students learn how to write academic essays of 1500-2000 words length. First, mind map is introduced to help learners collect their own thoughts and pieces of reference information, and determine their opinion statements. Then, an outline map is introduced; using it learners extract materials that are relevant to their main statement and also explicitly classify the elements into opinion, evidence, and reason. Finally, our outlining scheme, called "detailed outline," is introduced to reorganize the resulting elements as a draft of text. The scheme of detailed outline is designed following the Rhetorical Structure Theory in linguistics (Mann and Thompson, 1988) aiming to facilitate thoroughly covering necessary elements and structurally organizing them to produce cohesive and coherent texts. To evaluate their effect on the learners, we conducted a questionnaire based on the scale for "feeling of difficulty" in writing composition (Kishi et al., 2012) in the beginning and the end of the semester. Paired t-test on the answers collected from 235 learners showed that the questions corresponding to the three factors, i.e., (a) text organization, (b) audience awareness, and (c) way of thinking factors, were answered significantly more positively in the end of semester. Since all of our outline tools visualize relations of elements, we speculate that introducing them helps learners produce and arrange their idea and consequently better understand the importance of cohesiveness and coherence in writing this length of texts.

Cluster Analysis of Learners Based on Their Perception of Writing Aids

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In an academic writing course for the first-year students at a university in Japan, we have introduced outline tools along with a three-step text production process, assuming opinion statement texts of 1500-2000 word length. First, mind map is introduced to help learners collect their own thoughts and pieces of reference information, and determine their opinion statements. Then, an outline map is introduced; using it learners extract materials that are relevant to their main statement and also explicitly classify the elements into opinion, evidence, and reason. Finally, our outlining scheme, called "detailed outline," is introduced to reorganize the resulting elements as a draft of text. The scheme of detailed outline is designed following the Rhetorical Structure Theory in linguistics (Mann and Thompson, 1988) aiming to facilitate thoroughly covering necessary elements and structurally organizing them to produce cohesive and coherent texts. To help learners learn to produce such texts, in addition to the above three tools, we use four means for giving learners feedback: (a) reflection sheet, (b) peer reviewing, (c) rubric, and (d) personal instruction. A questionnaire was conducted after the semester that asked the usefulness of each of our seven means in a 7-point Likert scale. A principal factor analysis for the answers from 198 learners revealed clear distinction between two major factors: "process-aiding tools" and "way of feedback". A cluster analysis based on the factor scores resulted four learner clusters. One-way ANOVA showed that the factor scores of each cluster were significantly different, indicating that these two factors have sufficient power in discriminating the adaptability of learners to the examined means.

P2-1: Cognitive Science, Cognition and Visualization, Cognitive Linguistics, Decision Making

Saturday, September 2, 2017, 08:30 – 12:00 PM

A Logical Approach to Global Reading of Diagrams

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Diagrammatic representations carry meaning at multiple levels. While individual elements of a diagram carry meanings in specific ways, groups of these elements can comprise perceptual patterns that carry higher-order meaning. For example, while individual bars in a bar chart may express the prices of a metal in individual months, consecutive bars that make up the shape of a downward staircase as a group, express a general downward trend of the price (Pinker 1990). Extensive studies have been conducted on the psychological mechanism for the comprehension of such higher-order information expressed in a diagrams (E.g., Ratwani et al. 2008, Gattis and Holyoak 1996). As psychological studies, however, they do not focus on the very phenomenon of higher-order meaning in diagrams. Why does a particular perceptual pattern in a diagram carry a particular meaning rather than other meanings? This question is distinct from the question of what particular meaning people actually read off the given perceptual pattern. In this presentation, we will show that addressing this fundamental question from the perspective of logic can illuminate the psychological mechanisms for global reading. Using our approach, the meaning relation that supports a higher-order meaning is seen to be a logical consequence of more basic meanings relations that support low-order meanings. Syntactic rules on the choice and arrangements of diagrammatic elements make an important link in this chain of logical consequence relation, and this accounts for the fact that diagrams can be designed (1) to generate higher-order meanings, (2) to help the viewer to learn novel conceptual patterns, and even (3) to mislead the viewer to read off non-present higher-order meanings. Thus, our model points to a systematic understanding of how people process higher-order information in diagrams.

Effects of Aging on the Perception of Audiovisual Simultaneity: Comparisons among Young, Middle-Aged, and Older Adults

Chih-Yi Hsia[1], Yi-Chuan Chen[2], Su-Ling Yeh[3], Meng-Tien Wu[1], Nai-Chi Chen[1], Pei-Fang Tang[1]
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To examine whether age-related declines in multisensory integration already occur in the middle-aged, we compared the perception of audiovisual simultaneity among healthy young (YA), middle-aged (MA), and older adults (OA) (N=35, 32, and 35, respectively; aged 21-34, 55-64, and 65-80 years, respectively). All subjects underwent an audiovisual simultaneity judgment experiment, in which a visual flash stimulus was presented from a computer monitor and an auditory beep stimulus was presented from two speakers on either side of the monitor. The stimuli were presented at 11 stimulus onset asynchronies (SOAs, ±600 ms, ±400 ms, ±300 ms, ±200 ms, ±100 ms, and 0 ms), with 20 trials for each SOA. Positive SOA indicated visual stimuli being presented earlier, and vice versa. Subjects had to judge whether the visual and auditory stimuli were presented simultaneously in each trial. Fitting the data using the model developed by García-Pérez & Alcalá-Quintana (2012), we compared the mean proportion of simultaneous responses across the 11 SOAs, the point of subjective simultaneity (PSS), and the width of the simultaneity window (δ) across the three groups. An Age x SOA interaction effect was found for the proportion of simultaneous responses across the 11 SOA ($p < 0.05$). The post-hoc tests revealed that compared to young adults, OA presented higher proportions of simultaneous responses at all SOAs ($p < 0.05$) except at -100 and 0 ms and MA presented higher proportions of simultaneous responses at -200, +200, +300, +400 ms, and +600 ($p < 0.05$). Both MA and OA groups also presented greater positive PSS and wider δ values than YA ($p < 0.05$), suggesting that they had more asymmetrical audiovisual simultaneity window toward the visual-leading side and had greater uncertainty in determining audiovisual simultaneity. This study shows that declines in the perception of audiovisual simultaneity already exist in the healthy MA. Funding: NSC102-2410-H-002-213-MY2

Perception of Audiovisual Simultaneity Independently Contributes to Dual-Task Gait Performance in the Aging Population

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Poorer dual-task gait performance is known as important risk factor for falls in the older population. Here, we investigated whether the perception of audiovisual simultaneity independently contributed to single- and dual-task gait performance in the aging population. Sixty-seven healthy middle-aged and older adults (aged 55-80 years) participated in this study. All participants underwent an audiovisual simultaneity judgment experiment, in which a visual flash stimulus was presented from a computer monitor and an auditory beep stimulus was presented from two speakers on either side of the monitor. The stimuli were presented at 11 stimulus onset asynchronies (SOAs, ±600 ms, ±400 ms, ±300 ms, ±200 ms, ±100 ms, and 0 ms), with 20 trials for each SOA. Positive SOA indicated visual stimuli being presented earlier, and vice versa. Subjects had to judge whether the visual and auditory stimuli were presented simultaneously in each trial. Fitting the data using the model developed by García-Pérez & Alcalá-Quintana (2012), we used the width of the simultaneity window (δ) to indicate how well the subjects judged the stimuli simultaneity, with a larger δ indicating poor judgement. All subjects also underwent gait assessment under single-task, motor dual-task (carrying a cup of water while walking), and cognitive dual-task (performing serial-7 subtraction while walking). Regression analyses showed that for motor dual-task

and cognitive dual-task gait performance, but not for single-task gait performance, δ independently contributed to double support time variability of gait, after controlling for age, sex, body height, body weight, vision, cognition, and lower extremity strength (adjusted R2 of the entire models= 0.162 and 0.358, respectively, $p< 0.05$ for both). This is the first study showing that declines in the perception of audiovisual simultaneity independently contribute to dual-task gait variability in the older population.

Improving Creativity by High Viewing Angles Using Virtual Reality

Yukiko Nishizaki[1\], Momoyo Nozawa
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Virtual reality (VR) technology has been studied for entertainment and education, and training methods based on VR technology are being developed in other fields, such as medical care and advertising. The head-mounted display (HMD) has been released to consumers very recently, and it is expected that individuals will use HMDs for various types of VR training. This study explored the possibility of improving creativity using VR technology. Both physical and psychological embodiment of metaphors, which thinking about a problem "on one hand" and then "on the other hand, for creativity promoted convergent thinking and divergent thinking in problem solving (Leung, et al., 2012). We examined whether creative skill improves by "extending one's field of vision". Participants engaged in a creative task while they watched scenes with a HMD taken from a viewpoint higher than a normal gaze and then taken at the height of a normal gaze. The results showed that when participants watched the movie taken from a higher viewpoint than usual, creativity measured by the Unusual Uses Test increased, as compared to when they viewed the movie at normal height, suggesting that potential for creativity improved while using VR equipment.

Adverbials with Antonymous Meanings in Corpus

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The role of adverbs is to add information onto other words (c.f., Hoye, 1997; Simon-Vandenbergen & Aijmer, 2007, Suzuki, 2011). This paper explores the use of adverbials *ly that modify adjectives in the British National Corpus (BNC). Several sets of adverbials were selected – strongly vs. weakly; positively vs. negatively; lightly vs. heavily; and actively vs. passively. Interestingly, it was observed that, many a time, the comparatively positive adverbs (strongly, positively, lightly) modify negative words, and vice versa. This can be observed from the top collocates, for instance, strongly opposed vs. weakly positive, positively dangerous, lightly armed, etc. We also removed the *ly ending and investigated these words when they become adjectives, namely strong/weak; positive/negative; light/heavy; and active/passive. It was discovered that as adjectives themselves, they are mostly modified by adverbs of degree (particularly, relatively, merely, etc.). This study showed how a positive adverb can tone down the negative meaning of the adjective that follows; and how a negative adverb weakens the positive meaning of some adjectives. This observation reminds us how complicated our communication system is – why one bothers to say weakly positive than negative; and positively dangerous than just dangerous. The adverbs serve more than just adding information, it could be ideological or just a token of indirectness. More functions are yet to be discussed.

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A Cognitive Linguistic Framework for Validating Taiwanese English as a Veritable World English

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It can be posited that any study of emerging world Englishes is embedded in cognitive linguistics—a move beyond the structural approach to languages to a functional paradigm in explaining their evolution. Today's globalized necessity is to be able to use English competently, rather than like a "native" speaker, an elusive label given that second and third language speakers of English today far outnumber first language speakers. Moreover, new users of English are reshaping what is considered acceptable English, and they are doing so beyond the reality of different accents and other phonological variations. Systematic lexical, morphological, and syntactic changes are also occurring and being documented as the new users of English construct meaning in this globalized language. This study explores one emerging world English, Taiwan East Asian Standard (izing) English (TEASE) and proposes its veracity within the framework of semantics and lexical pragmatics, two subsets of cognitive linguistics. This framework is particularly useful given that the literature's guidelines demarcating a specific world English's features and outright errors are indistinct. Moreover, notwithstanding the embryonic stage of a TEASE glossary, then dictionary and widespread acceptance, this study focuses on the classroom implications of encouraging Taiwanese educators and students to assume ownership of their brand of English, even within Taiwan's extant test culture. One research question exists: What are emerging in the public domain and in communicative acts that can be considered as stable semantic and pragmatic TEASE features? The methodology is qualitative, using content analysis of ex post

facto student and public data. Thus far, five features are identified as distinct in TEASE, though not necessarily exclusive, and are recommended for further study. One classroom implication for Taiwanese students is in motivating them for more effective English learning through exposure to the reality of different world Englishes and TEASE's place amongst them.

Applying the Analytic Hierarchy Process to Linguistic Adjectival Meaning Theory

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This study aims to theoretically predict the production of adjectival expressions by means of application of the Analytic Hierarchy Process, introduces by Saaty (1990, 1994, 2008, etc.), to the semantic structure of (scalar) adjectives. Among the components of adjective meaning are "norm," "objects for comparison," and "background/foreground scales," all of which greatly affect the use of those expressions, or work to decide whether an evaluative judgment is true or not (i.e., P or ¬P). In the linguistic domain, however, it has not been revealed how those elements are interrelated with each other to make such a judgment, and how we can make a theoretical prediction about the judgment based on that. The AHP is seen as an effective tool for dealing with complex decision making, which make it possible to calculate the value of each option. We apply this tool to the theory of adjective expressions in the following manners. First, the decision matrix analysis is introduced to think about how multiple sub-scales can be synthesized into a scale, where "ranks" of the alternatives are computed by multiplying each value of the alternatives by the importance of the criterion. Second, multiple pairwise comparisons are adopted to measure "weights" of background scales and objects for comparison: each of them are compared with one another in the round-robin system (rating 1 to 9), and then calculate a "priority vector." As a result of those, it gets much easier to predict the generation of adjectives that are quite subjective, variable according to situation, and inconsistent among individuals. For example, the following case can be taken into account; you say "that dog is cute" in the condition where you would think of your pet dog as the most preferential alternative and consider shortness of limbs as the most important sub-scale, etc.

End up: A Semantic Prosody Analysis

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Partington, Duguid and Taylor (2013:84), citing Louw (2000) and Morley and Partington (2009), said that end up means that "whenever we have ended up being or doing was not according to the original plan but has gone off programme in some way, and is no longer subject to our cognitive control." Because of this, end up is often used to refer to "negative outcomes". This paper collected 499 news articles from Proquest most request news that contained the keyword END UP in all grammatical forms. A total of 570 instances of END UP were collected and among these, END UP IN has 95 instances; END UP BEING has 65; END UP WITH has 62; END UP ON has 34; and END UP AT has 25, all of which constitute about 50% of the total instances of END UP in all the news articles. We then analyzed the connotation of these combinations in the news articles (redundant results were removed manually). These are some examples for analysis. It was found that end up requires analysis at the discourse level because it involves an assumption that is often in conflict with the outcomes. Positive "I'm a little disappointed. This might have been the best shot we had. But it might end up being a blessing in disguise," said Jim Jess, a Marietta tea party organizer.Negative. A Hollywood smile signals success, and the social pressure to have perfect teeth has led to a booming cosmetic dentistry industry. Yet as Otto illustrates in this fascinating book, millions of Americans lack access to basic dental care, and many end up in the emergency room with dental problems.Neutral. Because we get to choose who we follow, we may end up with different facts. We can actually create a constant supply of thoughts and statements from others who agree with everything we believe in, further reinforcing our values.

Hierarchical Bayesian Modeling of Creative Process

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"Predictive Processing is promoted by philosophers and neuroscientists as an emerging neural and cognitive architecture (Clark, 2016; Allen and Friston, 2016; Gallagher and Allen, 2016) and was shown to answer the systematicity argument (Kato, 2017). The framework tries to explain cognitive phenomena as emerging from the mechanism of hierarchical prediction error minimization in the brain, and implies the massively context dependent view of cognition in which presumably every part of cognition is influenced by prior knowledge to some extent. This process is shown to be captured as Bayesian inference. Humans do not just recognize patterns or acquire knowledge, but also create an abstract causal model (structure) of it. This structure is employed to make later learning in the domain much faster and easier. This phenomenon, called 'learning to learn,' have been modeled via Hierarchical Bayesian Models (HBM) in several learning domains (Griffith et al., 2010; Kemp et al., 2007). HBM use a hierarchical setting of parameters to categorize data and acquire abstract knowledge. We propose that creative aspects of humans seen in human culture including science and arts can also be formalized using this framework. By creative process, we refer to one in that people recognize familiar structures in data and analyze them using abstract knowledge they already have. Creative process specified as above is similar to that of 'learning to learn,' but two are slightly different in that 'creative process' requires the use of knowledge to not just categorize but to analyze the data and one's own knowledge. This suggests that underlying computational principle of 'learning to learn' and 'creativity' is essentially the same. The hierarchical setting is crucial, since 'learning to learn' includes meta-cognitive and meta-learning

processes, and human culture has been built through cumulative creation processes where novel structures are constructed based on existing cultural structures.

Cognitive Problems in Elder: An Intervention

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There's no one who wants their cognitive skill declined in old age. However, it can't be avoided. Cognitive problems often encountered by elder, this problems such easy to forget, lack quality of sleep, and so on. Cognitive problems will have an impact on almost all aspects in their daily life. Of course, these issues certainly need to be found an intervention. This research method using a systematic review and compared several intervention. Finding the intervention for these problems is necessary to be comprehensively discussed. This study aimed to compare the several interventions that already examined in those researches. Furthermore, we construct an combination preventive intervention that feasible to be applied for primary caregiver among the elder.

Cognitive Motivations in Chinese/English Translation

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"Keywords: embodiment simulation, iconicity, figure/ground, metaphor, metonymy, translation
Translation is a vital activity for many English/Chinese bilingual individuals. However, there is an apparent paucity in the research of cognitive motivations in Chinese/English (C/E) translation, although in the last forty years, cognitive linguistics has grown from its daring nascence to a sophisticated enterprise. The advances are marked by, to list just a very incomplete few: Lakoff and Johnson's metaphors we live by (1980), Langacker's cognitive grammar (1987), Talmy's cognitive semantics (2000), the discovery of mirror neurons at the University of Parma (Iacoboni, 2009), Pinker's language as a window into human thought (2007), Bergen's embodied simulation hypothesis (2012), and Barsalou and others' study of abstract concepts (2013). All these pioneering and monumental explorations have opened up systematic and insightful theoretical perspectives that not only have transformed our understanding of the relationship between language and thought, but also have handed us the torch of enlightening light that can guide our way to re-examine issues in C/E translation. In fact, many motivational issues in C/E translation can be addressed by theories in cognitive linguistics, such as conceptual metaphors and metonyms, iconicity, figure/ground, and embodied simulation. While this presentation qualitatively examines translation evidence of these areas, all the discussion will lead to the argument that the essence of translation is embodied simulation, a theoretical framework that contains such key points as:

・Most likely we understand language by simulating in our minds what it would be like to experience the things that the language describes.

・Simulation is the creation of mental experiences of perception and action in the absence of their external manifestation. We use our brains to simulate percepts and actions without actually perceiving or acting (Bergen, 2012).

・We understand the mental states of others by simulating them in our brain, and we achieve this effect through mirror neurons (Iacobon, 2009:34).

・A mirror neuron is one that is activated when a person performs a certain action or has a certain experience and also when the person observes someone else performing the same action or having the same experience (Coleman, 2009).

Through a renewed and detailed analysis of the two contrastive English translations of a well-know Chinese poem 天净沙•秋思, it is argued that the embodied simulation principles can persuasively govern the mental operations in translation. On the one hand, a translator derives mental simulation from the source language and culture, and such simulation is conditioned by his linguistic competence in the source language and his overall knowledge of the source culture, both of which are individualized by one's life experiences (cf. Schnelle, 2010: 25-6). On the other hand, the translator represents the simulations he has constructed from the source language into the target language and culture. The representation process and the final products, in turn, are constrained by the translator's linguistic and cultural competences in the target language and culture. Like language understanding, translation is a complex human engagement that cannot go far without embodied simulation. The observations gained from this research widen the emergent cognitive perspective in translation studies, a new approach that can be well-informed and solidly supported by progresses in cognitive linguistics and neural science.

Making Invisible "Trouble" Visible Increases Abstraction of Referring Expressions

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"One of the central findings in dialogue research is that interlocutors rapidly converge on referring expressions which become progressively systematized and abstract (Clark, 1996). This occurs for a wide range of referents, e.g. when referring to spatial locations (Garrod and Doherty, 1994), music (Healey, 2002), confidence (Fusaroli et al., 2012), and temporal sequences (Mills, 2011). Cumulatively, these findings suggest that interaction places important constraints on the semantics of referring expressions. However, there is currently no consensus on which interactive mechanisms underpin convergence. The Interactive alignment model of Pickering and Garrod (2004) favours alignment processes, the Grounding model (Clark , 1996) emphasizes the role of positive feedback, while Healey (2002) demonstrates the importance of miscommunication.

To investigate in closer detail the development of referential coordination, we report a variant of the "maze task" (Pickering and Garrod, 2004). Participants communicate with each other via an experimental chat tool (Healey and Mills, 2006), which selectively transforms participants' private turn-revisions into public self-repairs that are made visible to the other participant. For example, if a participant, A types:

A: ""On the top square""

and then before sending, revises the turn to:

A: ""On the top row""

The server automatically detects the revision and transforms it into a public self-repair, e.g.

A: ""On the top square umm I meant row""

Participants who received these transformed turns used more abstract and systematized referring expressions, but performed worse at the task. We argue that this is due to two opposite effects: The artificial self-repairs have the beneficial effect of enhancing problem detection and recovery from error by amplifying naturally occurring miscommunication (cf. Healey et al, 2013). On the other hand, once these coordination problems are resolved, the public self-repairs have an opposite, deleterious effect by decreasing participants' confidence in the referring conventions established during the task.

Changes in Temporal Cognition as a Measure of "Bodymind" Contagion Between Dancers and Spectators

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"The co-presence of bodies in intersubjective situations can give rise to processes of kinesthetic empathy and physiological synchronisation, especially in the contexts of dance: the body and attention of the spectators are oriented towards the dancers. We investigate the processes of “bodymind’s states” contagion between dancers and spectators and its relation to subjective measures of attention. In the Labodanse project we worked closely with the French choreographer Myriam Gourfink who develops a unique movement based on slower breathing of the dancers, generating an extremely slow movement without rhythmic ruptures. Phenomenological studies of her work report changes in temporal perception (TP), and changes in bodily attentional states. In order to quantify this change in TP we had 12 spectators perform two TP protocols (Spontaneous Tempo Production - STP - and Apparent Motion effect - AM - tasks) Before and after a 40-min live performance. We performed a control experiment with a choreography of a distinctly different quality of movement (14 subjects). Subjective reports were collected at the end of the performance. Physiological data was recorded during the performance. Post-performance, we observed a significant slowing down of STP, while AM was reported with longer temporal intervals. Neither of these effects was observed in the control condition. Correlations with subjective reports show a link between paying attention to the breath of the dancer and the change in the perception of AM. Correlations with physiological data are analyzed.The results suggest an expansion of the “specious present” (Wittmann). The absence of similar results in the control condition argues that 1) these effects were due to the specificity of Gourfink’s choreography; 2) changes in TP is a working proxy to study contagion of body-mind states; 3) the role of conscious attention to the breathing of the other enhances intersubjective processes as ""body-mind"" contagion."

A Comparison of Garden Path Sentences among Thai Junior and Senior Readers

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[2]Computer Science, Maynooth University, Maynooth, Ireland.

"Eye-tracking technology is used to infer cognitive processes in many reading studies. Eye movement analyses using garden path sentences have been instrumental in illuminating the online syntactic aspects of the reading process. The purpose of this study is to examine readers’ eye movements during the reading of Thai garden path constructions, and to compare reading patterns between junior and senior Thai readers. Thai writing system is theoretically appealing as it generally has no spaces between words and rarely uses punctuation. Therefore, word segmentation must be based on linguistic cues and, consequently, can be a source of ambiguity for the reader. The experiment described here uses compound nouns to construct garden path sentences based on word segmentation ambiguity. Data from a sample of Thai junior and senior high school students indicate that, despite profound differences between writing systems, the overall impact of sentence level ambiguity is similar to that found for English. The unspaced nature of Thai, however, gives rise to a distinctive pattern of regressive eye movements.

Effects of Interpersonal Verb and Social Context on Causal Attribution

Sang Hee Park, Kyung Soo Do[1], Kwanghyeon Yoo
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"With a sentence ‘Tom respects Linda’, Linda is regarded as the cause of the situation because of the implicit causality of interpersonal verb respect. However, with a sentence ‘The teacher respects the student.’ we do not judge the student as the cause of the situation, because respecting someone old seems more natural than respecting some one young. The two examples show that implicit causality of a verb and relationships between people can affect how we make causal attribution. In this research, we tried to investigate how the implicit causality of interpersonal verb (implicit cxausality) and the relation between participants of a situation (social relation) affect the causal attribution in two experiments. In experiment 1, participants read one sentence like “The teacher respects the student”, and made causal attribution. Causal attribution depends on the causality congruency of the two factors. When causality of the social relation is different from that of the implicit causality (incongruent condition), causal attribution that accords the implicit causality decreased. People also read the verb of a sentence longer in the incongruent condition. However, the implicit causality influence causal judgment more than social context. In experiment 2, participants read two sentences, the sentence used in Exp 1 as the first sentence and second sentence starting with one of the two participants of the first sentence. Participants rated the second sentence having subject consistent on implicit causality more appropriate than the sentence having inconsistent subject. These findings implied that interpersonal verb and social context all have impact on causal judgments, but implicit causality of interpersonal verb have more impacts on causality."

How Emotions Modulate the Expectation of Pain

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"Expectations of pain significantly bias the experience of pain in humans and different emotional states potentially influence this cognitive process. However, how pleasant and unpleasant moods affect pain expectations at the behavioral level remains unknown. Here, we aim to clarify if different emotional states bias effects of expectation on pain at behavioral level. In the current study, we manipulated the expectation of participants towards the upcoming painful stimuli and induced different emotional conditions by using the International Affective Picture System. In preliminary results, we found that both painful sensation and effect of expectation on pain were significantly modulated by picture-evoked emotions. Results obtained from this research will enhance our knowledge on how expectation interacts with emotion to shape human responses to pain.

Cognitive Constraints in the Appreciation of Abstract Paintings by Art Beginners

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"Beginners in art appreciation generally have “reality constraints,” in that they show a strong tendency to insist on identifying the depicted object in the artwork with its realistic expression. This tendency was observed in the appreciation of not only representative painting, but also abstract painting. In the case of the appreciation of representative painting, the reality constraints could be relaxed by reading the commentaries about the formal aspect of the paintings. In this study, we examined whether the style of abstract paintings and reading commentaries on them would influence art beginners’ responses to abstract paintings. Twenty-four pairs of college students participated in the experiment. In the first session (learning phase), participants appreciated two representative paintings with the help of any of the following three methods: reading the commentaries on the objects depicted in each painting, reading the commentaries on the formal aspect of the painting, and reading no commentary. In the second session (transfer phase), the participants viewed one of the two abstract paintings that had no commentary. The abstract paintings viewed were Kandinsky‘s “Composition VII,” which had a number of small elements of ambiguous shapes and various colors, and Mondrian’s “Composition with Large Red Plane, Yellow, Black, Gray and Blue,” which was constructed using rectangles of various sizes and colors, and bold black lines. In each session, the participants freely talked to one another while viewing the painting for five minutes.
The results revealed that the commentaries were not effective in changing the verbal response to the abstract paintings. On viewing Kandinsky, the participants insisted on interpreting the details as concrete objects like vegetables, animals, etc. On the contrary, in the case of Mondrian, the participants tended to focus more on the formal aspect of the painting, especially to identify the colors referred to in the title.

The Effects of Social-Media Messages Incorporated into Television on Topic Retention and Critical Judgement

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"We use various information sources for learning in everyday life. Among these, television plays an important role, and social media is gaining influence. We noticed that some television programs are beginning to incorporate social-media texts, such as Twitter. Incorporation of social-media messages may influence our learning from these television programs in two ways. First, incorporating social-media messages can cause split attention effects (Sweller and Chandler, 1994). Thus, the retention of viewers will be decreased since they are required to pay attention to both the program contents and social-media messages. Second, if the cognitive process is harmed as mentioned above, the attitude change and appropriate judgement will be inhibited. The viewers cannot process important information fluently enough to change their attitude and judge critically. To explore these effects of incorporation of social-media messages, we conducted two experiments with participants from different academic backgrounds: humanities or information sciences. A fake television program arguing about a pseudo-scientific topic was made for the experiments. In both experiments, thirty participants were randomly assigned to one of two conditions: with and without social-media messages screened during the program. We investigated content retention, changes in attitude, and judgement of persuasiveness in different situations concerning the topic. Results indicated that, although there was a difference in the strength of the effects, common tendencies were found in both experiments. As expected, the participants in the without-social-media-messages condition performed better on a retention test and showed less positive attitude toward the pseudo-science. However, contrary to our prediction, participants who received social-media messages tended more to appropriately judged that the pseudo-scientific proposal was not very persuasive. Based on these results, the cognitive and emotional effects of the social-media messages are discussed.

Feeling Like This Is Mine: Psychological Ownership Mediates Effects of Haptic Imagery and Effectance Motivation on Willingness to Pay

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Touching commodities during shopping facilitates purchase decisions. However, commodities are not always available to touch prior to purchase (e.g., online shopping). As an alternative strategy, just imagining touching an object and thinking about how it feels like (i.e., haptic imagery) has been found to facilitate psychological ownership. Our previous study revealed that haptic imagery increased psychological ownership via perceived control, regardless of the price of the imagined objects. In the present study, we investigated whether haptic imagery and effectance motivation could promote willingness to pay (i.e.,

WTP) through increased psychological ownership. Effectance motivation affects the feeling of efficacy and competence. When individuals associate ownership with control, they come to believe and expect that possessions provide control to their owner, and thereby serve as a source of effectance and competence related satisfactions. We used a 2 (imagery: haptic imagery vs. no imagery) × 2 (effectance motivation: high vs. low) between-participants design. Our results showed that haptic imagery directly promotes WTP, and this effect is fully mediated by psychological ownership. Further, effectance motivation also affects WTP. In the high effectance motivation condition, participants in the haptic imagery condition scored higher on WTP than did those in the no imagery condition. However, in the no imagery condition, participants with low effectance motivation scored higher on WTP than did participants with high effectance motivation. These results indicated that haptic imagery is one of the useful ways to satisfy the desire for control elicited by effectance motivation. The present study suggests that the simple cognitive practice of imaging touching elicits a strong and consistent effect on willingness to pay. To our knowledge, ours is the first study to demonstrate that manipulated effectance motivation, rather than individual differences, affects psychological ownership and WTP. Haptic imagery and effectance motivation are identified as innovative strategies for marketing.

Stimulus-Response Compatibility Between Physically and Psychologically "Warm-Cold" Visual Stimuli and Hand Temperature

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The current study examined the stimulus-response compatibility effects between physically and psychologically "warm-cold" visual stimuli and physical temperatures of participants' hand. Before the experimental sessions, participants were asked to immerse one hand in warm water and the other hand in cold water. In Experiment 1, either a warm or cold landscape picture (e.g., fire or snow) was presented in each trial. Participants were instructed to respond by pressing designated keys, with a warm hand for warm landscape pictures and with a cold hand for cold landscape pictures (consistent trials), or with a cold hand for warm landscape pictures and with a warm hand for cold landscape pictures (inconsistent trials). Results showed that the averaged response time in consistent trials was shorter than in inconsistent trials. In Experiment 2, either happy or sad face (suggesting psychological warmth and cold, respectively) was presented in each trial, and other procedures were similar to those in Experiment 1. As results, the averaged response time in consistent trials was shorter than in inconsistent trials only for happy faces. Therefore, our results suggested that information regarding physically and psychologically warmness-coldness are influenced each other (Williams & Bargh, 2008) and are shared between perceptual/cognitive and motor production systems.

Do Discrimination Tasks Produce Inhibition of Return for Gaze Cues?

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Attentional orienting is sensitive to types of cues and task demands. A target at the periphery cued location (valid) usually attracts attention, nevertheless, if the cue to target onset asynchrony (SOA) is longer than 300 ms, the inhibition of return (IOR) is observed. Changing detection tasks to discrimination tasks would induce a smaller IOR in a later time course. The goal of this study is to examine whether IOR generated in a discrimination task by gaze cues. Gaze direction is a central cue but is shown to induce IOR at 2400 ms SOA in a localization task. Therefore in this study we introduced 4 levels of SOA (2000, 2400, 2800, and 3200 ms) to test whether discrimination tasks can generate IOR. Thirty participants (mean 26.64 years old) were recruited. The discrimination task requested participants to distinguish the direction of a triangle (upward or downward). We use 10 photographs of real faces to introduce gaze cues. The validity of the cue was set to be uninformative. The IOR was significant at 2400 ms SOA (6 ms) and 2800 ms SOA (7 ms). Our data suggested that the central cue, gaze direction, can also induce IOR in a discrimination task. Therefore gaze cues shifts attentional focus in a similar manner with periphery cues though in a different time course.

Hemodynamic Response Observation during Motor Concept Task Using NIRS-Imaging

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In this study, we examined hemodynamic changes related to the motor concept in associative relations among words. Subjects were 10 healthy young adults. All subjects were right-handed and Japanese. Before measurement, the subjects were provided with written informed consent after receiving a full explanation of the study. For the experiments, we used a multi-channel Near-infrared Spectroscopy (NIRS) device. NIRS-imaging is an optical method which allows non-invasive measurements of changes in the concentration of oxy- and deoxy-hemoglobin in cerebral vessels. The measurement point intervals were 9mm and the probes were placed on bilateral areas covered from BA45 to posterior of BA22. The experiments' stimuli were selected from pairs of stimulus words and associated words in the Associated Concept Dictionary (ACD) and presented in the form of a visual stimulation to the subjects. The ACD is a Japanese dictionary with a hierarchical structure of words associated by human subjects based on seven semantic relations (hypernym, hyponym, part/material, attribute, synonym, action and situation). All the subjects have participated in association experiments for ACD and understand the associative concepts and their functions. In this study, we used action relation pairs, which is the stimulus words are nouns and the associated words are action verbs. During the action concept task, deoxygenation of hemoglobin occurred in left BA22, while oxygenation occurred in left posterior of BA41. Deoxygenation also occurred in right posterior of BA45 to 44. Thus, it suggests that this

response is related to the motor concept processing. This study clarified that it is possible to correlate brain activation to the associative relations among concepts using NIRS-imaging.

#Thedress Phenomenon Accounted by Individual Differences in Spatial Context Processing

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The individual difference in perception is revealed by the photo of #TheDress. With the same photo, some observers perceive a dress as blue-and-black dress and the others perceive it as white-and-gold. The current study hypothesize that the individual difference in perceiving spatial context contributes to the phenomenon. The estimation of illumination is affected by spatial context and therefore the perception of the color of a target surface is influenced. The hypothesis is tested with a dual-masked paradigm assessing the spatial context effect on the visual performance to a target. In the task, the participants were to detect a 4 cy/deg vertical Gabor target superimposed on a vertical pedestal (contrast ranged from 0-40%) in the presence of collinear and iso-oriented Gabor flankers (50% contrast). Among 53 participants, 38% reported seeing a blue-and-black dress (BB) and 57% reported seeing white-and-gold (WG). At low pedestal contrasts, the presence of flankers produced a greater target threshold reduction in the BB group. At high pedestal contrasts, no consistent difference in the flanker effect was found between groups. These flanker effects were fit to our sensitivity modulation model, which suggests the effects are multiplicative terms applied to both the excitatory and inhibitory terms of a divisive inhibition response function. The model parameters revealed that the greater flanker facilitation observed in BB group resulted from increment in flanker excitation rather than reduced flanker inhibition. The findings are in support of the notion that estimation of the global features of a scene, in turn, the perceived reflectance or color of a target surface is under the influence of sensitivity to context.

Neural Correlates of Unconscious Semantic Priming: An MEG Study

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Visual crowding refers to a phenomenon that conscious identification of a peripheral object is severely impaired when it is surrounded by flankers. Evidence from our previous behavioral and event-related potential (ERP) studies indicates that semantic priming can occur even when the prime word was crowded and unrecognizable (Yeh et al., 2012; Zhou et al., 2016), suggesting that semantic information survives visual crowding. The present study used Magnetoencephalography (MEG) to investigate the time course of brain activation when an isolated or a crowded prime word preceded a single target word, and the prime was either semantically related or unrelated to the target. Results showed that the contrast between related and unrelated isolated primes activated the left middle temporal gyrus (MTG) during 400-600ms after the onset of the subsequent target. For the contrast between related and unrelated crowded primes, however, activation was shown in the middle frontal gyrus (MFG), inferior frontal gyrus (IFG), and postcentral gyrus during 400-600ms. These results suggest that, while both isolated prime and crowded prime lead to semantic activation so as to affect target processing, when the target is preceded by a crowded prime it requires more spread processing in the semantic network than when preceded by an isolated prime.

In Search of Point of No Return in Prepotent Action

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One of critical issues in executive control is how the nervous system can exert the flexibility to inhibit a prepotent response to meet the sudden change of the environment. Many studies employed the stop signal task with measurements of response times and also with a variety of devices such as EEG, EMG and dynamometers for investigating the point of no return and its locus in the neural system during the stopping processes. The present study aims to elucidate the mechanisms of the inhibitory control by using EEG, EMG and detailed response force measurements. We measured the response force, response speed, peak force and rising rate to peak force in Go trials, Stop trials and also partial response trials in the Stop condition. The results showed that the reaction time was slower and the peak force was stronger in Go trials than in erroneous Stop trials (non-cancelled stop trials). This replicated previous findings (e.g.: De Jong et al., 1990; Ko et al., 2012). Importantly, we found that the peak force increased as a function of the stop signal delay but did not reach to the peak force exerted in the Go trials. This peak force increase may indicate that the inhibitory system is still in effect even after a response is well on its way suggesting that the point of no return, if any, is dependent only on the brain processing speed and the time it takes for the signal to be transmitted to the point of interest. Moreover, the latency from pinch-response to peak force was longer in Go trials than in non-cancelled (Stop-respond) trials, indicating that the inhibition system has an active role even when our motor behavior seems to already be committed. We also calculated the peak force in the non-cancelled responses and found that the peak force in most of the non-cancelled trials (61%) were much smaller than the peak force of Go trials (2SD below the mean). These patterns of results indicate that participants could partially inhibit their responses despite that they could not fully stop their prepotent action which suggesting the point of no return could occur in both central and peripheral nervous systems.

The Effect of Stochastic Endowment on Risky Choice

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"The endowment effect – a tendency to value a good more when owning it – has been attributed to aversion to loss caused by change in reference point. Köszegi and Rabin proposed an expectation-based reference-dependent model in which the reference point is stochastic. The model makes unique predictions on the endowment effect on risk that have received mixed empirical support thus far. In this study, we investigated whether the inconsistent findings are due to the effectiveness of the endowment manipulation. Methods. Each subject carried out 72 trials for the experiment. On each trial, the subjects were first endowed with a lottery. Following the presentation of the endowed lottery, a new lottery was presented. The new lottery generated based on the endowment with reward probability difference (±15%, ±10%, ±5%) and the expected value difference (0, ±2 coins). Subjects can decide whether to keep the endowed lottery or switch to the new lottery. In either case, the lottery she/he eventually chose became the endowment on the next choice. Results. 30 subjects participated in the experiment. First, our results show subjects tended to keep the lottery endowed by their own choice but not the endowment initially given to the subjects. Second, consistent with the theoretical prediction, the endowment effect (the frequency of keeping the endowed lottery) was affected by the probability of reward associated with the endowed lottery. Third, this effect was mediated by the difference in probability of reward between the lotteries. That is, subjects became more risk averse/seeking when endowment had a higher/smaller reward probability. Together, these results indicate that probability difference mediated the reference-dependent preference and that the effect of stochastic reference point on risk attitudes was larger under greater sense of ownership.

The Modulation Effect of Significant Others' Attitudes on One's Shopping Decisions

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Under our social network, easily observed phenomena about social interaction that a person would depend on significant other's opinion to make the decision. However, little research focuses on how romantic relationship affects on shopping behavior among young couples. In this study, we explore the interaction of young couples over one year and expect the areas responsible for theory of mind (TOM, especially temporal-parietal junction, or TPJ) would be especially activated when considering others. The behavioral results showed clearly the modulation of the romantic relationship on one's own buying decision: compared to one along make the decision, people tend to change their original buying ratio in the preference of other's ratings. The neural activity at the time of buying decision revealed the strongly activated regions in the TPJ, anterior insula, and superior temporal sulcus associated with TOM. Next, the psychophysiological interaction (PPI) analysis was used to estimate the functional connectivity in the rTPJ as a seed region in the conflict and consensus conditions, the results show that caudate, insula, anterior cingulate and the medial prefrontal area had increased connectivity while considering the other's rank. In our task, the evaluation of shopping network is explored from the significant other outside the scanner before the shopping decision (how the other likes the decision). The result implies that the significant other's attitudes did modulate the purchase decisions when couples face the conflict via real-time social interaction.

P2-2: Cognitive Psychology, Consciousness, Ergonomics, Human Intelligence, Learning Technology

Saturday, September 2, 2017, 01:00 – 16:30 PM

The Impact of State Anxiety on the Accuracy of Retrospective Metamemory Monitoring

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Metamemory – one's knowledge and awareness about memory – is of vital importance to one's development and contains three parts: knowledge about memory, control over memory and monitoring on memory. Among these three, monitoring is the most important which includes prospective monitory such as EOJ, JOL and FOK, and retrospective monitory – judgment of confidence (JOC). Although prospective monitory has been studied extensively, there is not enough research on retrospective monitory. Previous studies have found self-efficacy and positive and negative affect have impact on participants' accuracy of JOC, yet there's no evidence showing the relationship between anxiety and retrospective monitory since anxiety has been an ever-increasing problem for the society. Therefore, in the present study, we tend to explore the relationship between state anxiety and accuracy of JOC. We manipulated level of anxiety of participants by using continuous calculation task and structured interview respectively on experimental and control groups. Then we measured participants' accuracy of JOC using a 10 questions questionnaire about a 5-min video they watched before. We found that participants in experimental group had a less accurate JOC compared to people in control group and that the more anxious one was, the less accurate his JOC would be. Although the interaction between group and gender was not significant, there was still a trend that male and female participants had different patterns. Meanwhile, types of learning – latent and overt learning – also seemed to have an impact on JOC accuracy.

Working Memory Maintenance of Face Identity is Interfered by Facial Expressions: An ERP Study

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Fearful faces attract our attention easily and they can also serve as distractors for a visual working memory (VWM) task. Event-related potentials (ERPs), and especially a component termed contralateral delay activity (CDA), have been used to index the VWM storage. Previous studies utilizing CDA have shown that storage of facial identities in VWM is affected by fearful faces as distractors. Distractor effects of other facial expressions have not been investigated. In addition, it is not clear if VWM for the face identity and its interference by facial emotions correlates with participant's VWM capacity for neutral objects. In the present study, we first measured the participants' VWM capacity for neutral objects, and then investigated their ability to store facial identities while recording ERPs. By using the CDA component to index VWM maintenance, we found that participants with high capacity for neutral objects were more accurate in face identity task than low-capacity participants. The CDA results showed different pattern for the high and low VWM capacity group suggesting that high VWM participants maintain the similar visual information across neutral, angry and happy two-target conditions while angry faces as targets boosted the VWM capacity for the low capacity group. In addition, different emotional distractors would have different effects on the VWM maintenance. The results suggested that when the VWM resources are sufficient, visual information can be maintained similarly for the different facial emotions, but when the VWM resources are limited, the maintenance of the threatening faces is preferred.

Comprehension of the Interrogative Word Shenme 'What' in Mandarin Chinese

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The interrogative word shenme 'what' plays a critical role in expressing questions (e.g., shenme shuiguo meiyou ren chi? 'what fruit did nobody eat'), but few empirical studies have addressed the comprehension of its non-interrogative meaning in statements (e.g., shenme shuiguo Dou meiyou ren chi. 'Nobody ate any fruit'). It is generally agreed that shenme 'what' expresses the (non-interrogative) universal interpretation when combined with Dou, as in the example above. In Mandarin Chinese, this characteristic is also shared by a negative polarity item renhe 'any', which is a synonym to shenme 'what' as in renhe shuiguo Dou meiyou ren chi 'Nobody ate any fruit'. To compare the interpretations of shenme 'what' in the linguistic context with and without Dou with the interpretation of NPI renhe 'any' before Dou, we conducted four behavioral experiments in which we employed the Question-Statement Task developed by Zhou and Crain (2011) to examine the interpretations between spoken and written sentences by mature speakers of Mandarin. Different from 'renhe+Dou', which resulted in the universal interpretation consistently, 'shenme+Dou' depended on the presentation modality and the position of shenme 'what' in the sentences. The results showed that 'shenme' at subject position which combined with Dou (e.g., shenme ma Dou meiyou mai bingqilin 'None of horses bought ice creams') was more likely to be interpreted as an non-interrogative expression (62.5%) in written sentences than in spoken sentences (6.9%), while at object position (e.g., shenme shuiguo tuzi Dou meiyou chi 'None of rabbits ate the fruit'), "shenme+Dou" was accepted as universal expression with higher possibility in written sentences (95.8%) than in auditory sentences (75%). The present findings identify that much attention should be taken into syntax/pragmatics interface to elucidate how they interact with each other.

Binaural Localization of Musical Pitch Using Interaural Time Differences in Congenital Amusia

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Naturally occurring sounds are routinely periodic. The ability to phase-lock to such periodicity facilitates pitch perception and interaural time differences (ITDs) determination in binaural localization. We examined whether deficient pitch processing in individuals with congenital amusia (tone deafness) is accompanied by impaired ability to localize peripheral binaural musical pitch at the short-term memory level. If common mechanisms subserve processing of temporal-fine-structure based pitch and ITDs, then deficient processing of one feature should impair performance on the other. Thus, we measured ITD discrimination thresholds using an adaptive-tracking procedure for lateralizing musical tone pairs separated by different semitone intervals. ITD thresholds were unimpaired by concurrent pitch changes, even when pitch variations were increased to 5 semitones in congenital amusics. For short-term memory tasks, the amusic group performed significantly worse than matched controls in probed pitch recall, irrespective of the complexity level of concurrent variations along the ITD dimension of the melodic sequence. Interestingly, despite normal peripheral ITD thresholds, amusic individuals performed worse than controls in recalling probed locations of tones within a sequence of musical notes originating from different ITD-simulated locations. Our results suggest that individuals with congenital amusia are unimpaired in peripheral signal encoding to determine musical pitch and process binaural ITDs. The results further imply that musical pitch and binaural ITDs can be processed separately at the auditory short-term memory level. Consistent with studies proposing higher-order processing deficits in amusia, our findings demonstrate that pitch-specific deficits in amusia are unlikely to be due to temporal-fine-structure coding in the auditory periphery and provide further evidence of dissociated, but impaired, pitch and ITD encoding process at the auditory short-term memory level.

Long-Term Learning Effect on Audio-Visual Processing of Chinese Characters and Speech Sounds

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"Associating written symbols to speech sounds are crucial for

literacy acquisition. Here we investigate the long-term learning effect of orthographic–phonological associations with magnetoencephalography. Eleven native Chinese and thirteen Finnish participants were measured during an audio-visual experiment using Chinese characters in which auditory only (A), visual only (V), audio-visual congruent (AVC) and audio-visual incongruent (AVI) stimuli were presented randomly. To make sure the participants paid equal attention to both auditory and visual modality, there were testing trials occurring with 7.5% possibility in which the memory of character and/or sound one trial back were tested. Minimum-norm source estimate of the event-related fields were computed by combining freesurfer average brain template and MEG data. Permutation test with spatial-temporal clustering revealed a congruency effect ($p=0.018$) in the Chinese group but not in the Finnish group. This effect was mainly localized in the left auditory cortex (Heschl's gyrus) and showed stronger activation to incongruent audio-visual pairs in a late time window (465-875ms). Between group comparisons showed stronger brain activations to the auditory and audiovisual stimuli in the left and right superior and middle temporal cortex in the Chinese group compared with the Finnish group. The Chinese group also had stronger activations in the left motor, left and right fusiform cortices when presented with visual stimuli.

In conclusion, learned associations between Chinese characters and speech sounds lead to stronger cortical response for incongruent audio-visual pairs in Heschl's gyrus and larger activation in brain areas where visual and auditory information are processed and integrated.

Effects of Commonality Search Training on Creative Idea Generation: Examining the Relationship between Quantity and Quality of Generated Ideas

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The purpose of this study was to investigate the effects of commonality search training on creative idea generation. Our previous study found that searching the commonality between apparently unrelated objects helps one find original perspectives. Based on the results, we assumed that one could generate original ideas using commonality search as a strategy if s/he repeatedly practices it. Forty-six undergraduates were assigned to one of two conditions: commonality search and word association. While the participants in the commonality search condition listed the commonalities between the apparently unrelated objects (e.g. a strawberry and television), those in the word association condition listed as many words as they remembered from each object. Thereafter, the participants in both the conditions were asked to list their ideas about the unusual uses of wire hanger. Two independent evaluators scored the ideas generated by the participants on a 7-point scale in terms of feasibility, originality, and attractiveness. The results revealed no significant differences between the conditions with respect to the quantity and quality of ideas. The results also showed that the correlations between the number of ideas and the feasibility of ideas differed between conditions. Specifically, in the word association condition, there was a significant and negative correlation between them, indicating that the more the ideas were generated, the less feasible they were. On the other hand, in the commonality search condition, there was no significant correlation between them. Although the effects of the commonality search training were not seen in the quantity and quality of ideas, it was seen in the relationship between the quantity and quality of ideas. The results suggest that commonality search training may improve the process by which one generates ideas.

Effects of Recalling "Bitter" Experiences on Taste Preference

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We investigated the effects of recalling bitter experiences on taste preference. There are many expressions for describing feelings using words referring to tastes, such as bitter or sweet, suggesting a close link between feeling and taste. We assumed that one tends to regulate his/her unpleasant feelings by consuming something with an opposite taste. Specifically, we hypothesized that one prefers something sweet when s/he has a "bitter" feeling. Sixty-nine undergraduates were randomly assigned to one of three conditions: bitter, sad, and neutral. Participants in the bitter and sad conditions described their experiences of failure and loss respectively, and rated the valence of their recalled experience. Those in the neutral condition described a place they had been to, recalling that experience from stimuli including tree, air, water, sun, and earth. All the participants scored their present emotion states. Finally the participants rated how much they were willing to eat each chocolate and chose a chocolate that they wanted to eat most out of four chocolates with sweet, bitter, salty, or sour tastes. The results revealed that the experience recalled by the participants in the bitter condition were more self-accusing than those in the sad condition. Further, the participants in both the bitter and sad conditions had more negative, less aroused, and more self-accusing feelings than those in the neutral condition. Finally, the participants in the bitter condition chose the sweet chocolate more than those in the sad condition, and those in the sad condition wanted to eat the sweet chocolate less than those in the neutral condition. We concluded that recalling bitter experiences enhances the preference for eating something sweet through the link between feeling and taste.

Does Reading Opposing Views of Information in Different Orders Affect Comprehension Processes –Comparisons of College Student Performance and Cognitive Modeling from the Landscape Model

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In this study, we compared college readers' comprehension processes when reading texts with different perspectives presented in different orders. An authentic article discussing the issue of "Whether ADHD patients needed to take medicine?" was modified and manipulated the order of describing two opposing views on this topic: one version stating "for medicine use" information first then "against medicine use" information second, another version reversed the order of information. All information in individual section of "for medicine use" and "against medicine use" was the same across all conditions. Both versions of text also had an identical introduction section. Seventy mature readers participated in this study and they were randomly assigned into those two reading groups. Participants read texts sentence by sentence on computer and reading times were recorded. Their background knowledge on ADHD, free recall data, reading comprehension scores and reading spans were also collected. In addition, the simulation program of the Landscape Model of comprehension were employed to model readers' performance following the standard procedures: First, we determined text reading cycles by sentence boundary. Next, we parsed major nodes for each sentence and identified the coherence relationships among these nodes. We then set the parameter values for these relationships as sources of activation which include direct retrieval, referential connections, causal inferences. Finally, an input matrix was formed from the above steps and was submitted to the program for simulation. A resulting activation matrix and a connection matrix were produced for each separate simulation representing predictions of the Landscape model. The results showed that the activation matrix information significantly correlates with reading time data and the connection matrix information accounts recall data significantly. The patterns indicate that the Landscape Model effectively simulate readers' comprehension performance. Reading opposing view information in different order did not affect readers' amount of recall and neither did it on readers' attitudes toward prescribing medicine for ADHD patients.

Working Memory Capacity Moderates the Effect of Syntactic Ambiguity on Mind Wandering and Eye-movements

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"Previous studies found mind wandering alter readers' reading behaviors related with lexical properties of words (e.g. word frequency effect). However, how about syntactic properties? Does mind wandering also alter readers' reading behaviors related with the syntactic structure of a sentence? The present study focused on to which extent the garden path sentences alter readers' frequencies of mind wandering and eye-movements. To further examine the mechanism the underlying mechanism, readers' working memory capacity (WMC) was also measured. The result revealed that readers with high WMC showed more task unrelated thoughts (TUTs) when reading the garden path sentences than the non-garden path ones. Whereas, readers showed equivalent amount of mind wandering when reading the garden path and non-garden path sentences. Furthermore, the eye-movement behaviors analyses revealed that readers with high WMC tended to show garden path effect (i.e. the difference of total reading time between garden path sentences and non-garden path sentences) on critical region (i.e. disambiguous region) prior to TUT response. However, the garden path effect was attenuated for readers with low WMC. The comparison of attenuation of word frequency and garden path effects during mind wandering was discussed.

Cumulative Impact of Trait Mindfulness and Trait Anxiety on Executive Functions

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The existence of variability among people in their cognitive abilities is a well-known fact. There are a number of ways in which cognitive and neurophysiological measures have been consistently used to explain such variability. However, little has been done to explore how the sources of such variability in cognition are influenced by individual differences in personality traits. Dispositional mindfulness and anxiety are two reciprocally linked traits that have been independently attributed to a range of cognitive functions. Nonetheless, there are no studies which have considered how the interaction between these two traits influences executive function. The current study investigated the relationship between these two traits and measures of executive control. Two groups of healthy young adults (divided into high mindfulness, low anxiety and low mindfulness, high anxiety) performed an attentional network task, a color Stroop task, and a change detection paradigm of visual working memory capacity task. Results showed that high mindfulness, low anxiety individuals were more accurate than the low mindfulness, high anxiety individuals on Stroop and change detection tasks. Additionally, the former group was shown to be more sensitive in detecting change and exhibited higher working memory capacity than the latter group. The present research attempts to bridge the gap between the literatures those have investigated mindfulness and anxiety independently. It also offers a direction for future studies looking at interventional programs such as meditation or cognitive behavioral therapy and may also guide how to identify individuals who might benefit most from such interventions.

Long-Term Memory for Moving Stimuli

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We investigated how long visual memory for moving stimuli could be retained. The stimuli consisted of a moving circle. There are two sessions in the experiment and the second session were conducted four weeks after the first session. In the first session, some stimuli appearing in the second session were presented two times each. The participants observed them under incidental condition. The second session consisted of a study phase and of a test phase. In the study phase, the participants

observed stimuli in a manner similar the first session. Half of the stimuli had been presented in the first session, and the half of them were novel. Then, the participants were given a surprise recognition test. In this task, they had to decide whether the presented stimuli had appeared in the prior study phase or not. As a result, it was found that the presentation times of stimuli affected the performance of the recognition test, and the hit rate for the stimuli which had been presented in the first session was higher than that for the stimuli which had not. This indicates that visual memory for moving stimuli observed under the incidental condition can be remained for long-term.

Mean Size Estimation Yields Left-Side Bias: Role of Attention on Perceptual Averaging

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"Human visual system can estimate mean size of a set of items effectively; however, little is known about whether information on each visual field contributes equally to the mean size estimation. In this study, we examined whether a left-side bias (LSB)—perceptual judgment tends to depend more heavily on left visual field's inputs—impacts mean size estimation. Participants were instructed to estimate the mean size of 16 spots. In half of the trials, the mean size of the spots on the left side was larger than that on the right side (the Left-larger condition) and vice versa (the Right-larger condition). Our results illustrated a LSB: a larger estimated mean size was found in the Left-larger condition than the Right-larger condition (Experiment 1), and the LSB vanished when participants' attention was cued to the right side (Experiment 2). Furthermore, the magnitude of LSB increased with stimulus-onset asynchrony (SOA) when spots on the left side were presented earlier than the right side. In contrast, the LSB vanished and then induced a reversed effect with SOA when spots on the right side were presented earlier (Experiment 3). This study offers the first piece of evidence suggesting that the LSB does have a significant influence on mean size estimation of a group of items, which is induced by a leftward attentional bias that enhanced the prior entry effect on the left side.

Characterizing the Impact of Aging on Implicit Inhibition

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Inhibitory functions are crucial for keeping our behaviors under control, and it is prone to the influence of aging. One way to categorize inhibition is based on how it corresponds to willful control. While controlled inhibition is prone to the influence of subjective will, automatic inhibition is less so. In the current study, we carried out two experiments to explore the impact of aging on implicit inhibition. In Experiment 1, we adopted a location negative priming (LNP) task where the participant responded to a pair of prime and probe stimuli (white circle) in every trial. We manipulated the duration between the response to prime and the probe onset (response–stimulus interval, RSI, between 389, 931, 1463, and 1995ms) to explore the evolution of NP effect across time and also compared age difference in the time course of NP. In Experiment 2, we combined Go/No-go task with the LNP task where the participant was instructed to withhold response upon seeing yellow circle in the prime, but respond otherwise. We found that for the young participants, the shape of NP effect function changed more gradually across time than the elder's. Moreover, the NP effect at the 389 ms RSI is relatively large than the other RSIs. For the elderly participants, the time course of NP effect appears to be a inversed-V shape curve which peaked at the 931 ms RSI. For the second experiment, we found that for the young participants, NP effect of Go trials is much larger than No-go trials, yet for the elderly it did not differ. To summarize, we found that aging impacts how implicit function is manifested after it is triggered. Further exploration with neuroimaging techniques and theoretical accounts for the age-related of implicit inhibition will be discussed.

Can The Origin Of Social Status Modulate the Perception Of Fairness?

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Many economic studies have demonstrated that the sources of income—whether earned through efforts or obtained based on luck—can influence people's willingness to further redistribution of wealth. To investigate the underlying cognitive mechanisms for such behaviors, we examined whether the origin of social status, a variable that is strongly associated with income in the society, would modulate the satisfaction of monetary distribution by people with different social statuses that were either determined by efforts or by luck. Specifically, in the first stage of the experiment college students were labelled as winners or losers against an opponent based on pure luck (i.e., random drawing), a mixture of luck and efforts (i.e., performance in a math estimation task), and real efforts (i.e., a number-line dissection task). The winners in all experimental contexts received the same amount of monetary reward, while the losers received nothing. In the second stage of the experiment, all participants were asked to make satisfaction ratings on the distribution of an additional amount of monetary reward between themselves and the opponent. The results showed that in the second stage all participants preferred to receive more money than their opponent, but the preference was stronger when the social status in the first stage of the experiment was determined by real efforts than by pure luck. On the other hand, the social status per se (i.e., being a winner or a loser) did not modulate people's satisfaction of reward distribution. Furthermore, people seemed to perceive their performance in the math estimation task being determined by luck rather than by efforts. In summary, we found that participants involved in the real effort task were more driven by self-interests, while participants involved in the pure luck task showed higher satisfaction with fair or self-less distribution. "

Object Size Moderate The Mental Simulation of Object Orientation; The Language Could Too.

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Match effects of object orientation in the sentence-picture verification task are consistently smaller than object shape, color, and size. We hypothesize that this may be due to the fact that the orientation objects are small and manipulable. This study asks the questions if object size constraints object orientation effects, such that effects for smaller, manipulable, items are smaller than for larger, nonmanipulable objects. Our pre-registered experiment manipulated two within-participant variables: object size (large, small) and matching of probe sentence and target picture (matched orientation, mismatched orientation); one between-participant variable: languages (English, Dutch, Chinese). Two predicted results were to be confirmed based on our pilot study: (1) the orientation effects for the large objects would be beyond those for the small objects; (2) the effects generalize across languages and that language will not be a significant moderator of the observed effects. The current results confirm the first prediction, but the extraordinary effects of Chinese reveal the moderator of languages to be explored. This talk will present the works of our pre-registered experiment and the coming exploratory study.

Statistical Learning of Nonadjacent Dependencies in Sequential and Simultaneous Visual Shapes

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Statistical learning (SL) is the ability to detect regularities in the environment, and plays a critical role in survival of organisms. Previous literature suggests that SL is a general mechanism for learning and processing any type of sensory input that unfolds across time and space, as empirical evidence shows that adults and infants can readily pick up on regularities among adjacent elements. However, whether SL is also possible when the dependent elements are nonadjacent remains to be determined. To answer this question, we employed a visual statistical learning (VSL) task in which 24 relatively complex visual shapes were randomly organized for each participant to create eight nonadjacent triplets. In the sequential condition, the visual shapes in triplets appeared one after the other, with a fixation cross separating different triplets. In the simultaneous condition, the visual shapes in triplets appeared from left to right in the same frame. After a familiarization phase in which each triplet appeared 20 times, participants were asked to perform 32 trials of familiarity judgement and 32 trials of recognition. The results demonstrated that participants were capable of learning nonadjacent dependencies in sequential and simultaneous visual shapes with comparable accuracy. Moreover, significant correlation was detected between participants' IQ scores (as measured by Block Design) and their implicit knowledge of the nonadjacent dependencies (as measured by the task of familiarity judgment), suggesting a common mechanism supporting SL for both sequential and simultaneous dependencies. On the other hand, participants' working memory (as measured by Symmetry Span) was only significantly correlated with their explicit knowledge of the nonadjacent dependency in sequential but not in simultaneous visual shapes, implying that there might also be specific mechanisms supporting these two kinds of SL. Further research is needed to examine the relationship between SL of different kinds of dependencies and implicit/explicit learning capacities.

Passive Viewing Activates Self-Referential System Associating with Body Embodiment

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"Facial expressions are not only salient signals to express one's emotional state but also an ingratiating strategy for social interaction and communication. Embodied emotion, a model of emotion contagion, is proposed as a two-stage process, including automatic facial mimicry and muscular feedback. The present study aims at unraveling the underlying neural circuitry and its temporal scenario of embodied emotion by combining recordings of facial muscular activity, magnetoencephalographic signals, and self-report pleasantness rating. Forty subjects (mean age 25.4 ±4.3 years old; 20 males) were recruited in the study. Each subject was instructed to passively view or voluntarily imitate the displayed video clips (2 seconds each) of smiling with different strengths (0%, 50%, and 100%) and then to report his/her pleasantness level at the end of each block (20 clips in each block). The electromyography (EMG) of the bilateral zygomaticus major muscles and the whole-brain magnetoencephalography (MEG, Neuromag Vectorview system) were simultaneously recoded when they were exposed to smiling video clips. Spatiotemporal maps of brain activity for the event-related alpha-band MEG data were estimated using the beamforming method, followed by parametric analysis with flexible design ($p<0.05$, uncorrected; extended cluster size > 20) for each condition. Significant bilateral EMG activations and elevated pleasantness levels were found in both passive viewing and voluntarily imitating conditions. The temporal profile of brain responses was partitioned into three time windows: anticipation, information catching, and behavioral response periods. During information catching period, we found the inferior parietal lobule, precuneus, dorsomedial prefrontal cortex, somatosensory association cortex, and inferior frontal gyrus under imitation instruction. The results of passive viewing showed the posterior insula, premotor, precuneus, supramarginal gyrus, and dorsolateral prefrontal cortex. Instruction/intention is a strong top-down cognitive control and modulates the information process in the brain. Our findings demonstrated two

distinct cortical pathways responding to smile expression: voluntary facial mimicry utilizes simulation for information catching, whereas spontaneous facial mimicry engages neural system of mentalizing. These suggest MEG as a potential tool for understanding temporal dynamics of neural networks in emotional information processing.

Who Is More Flexible?—Awareness of Changing Context Modulates Inhibitory Control in A Priming Task

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Inhibiting distractors is important for goal-directed behaviors. However, with the context changes, previous distractors that are detrimental for survival might become beneficial. Therefore, releasing the previous inhibition whenever the environment needs is also important for us to adapt to such dynamic world. The aim of the present study is to examine how cognitive resource and awareness of changing context influence the modulation of inhibitory control. We manipulated the probability of a prime correctly predicting the following target during three phases in a priming task. A prime would act as a distractor when the probability is low (25%), while act as a useful cue when the probability is high (75%). In addition, we also measured participants' working memory capacity (WMC) as the index of cognitive resource and their awareness of the change of context contingency. The results showed that, regardless of WMC, only participants aware of changing context modulated inhibitory process corresponding to the present context contingency when the stimulus-onset asynchrony (SOA) is short (experiment 1). However, such effect of awareness disappeared when SOA became longer (experiment 2). Such finding revealed that awareness of context might have more impact on the modulation of inhibition than WMC and such influence might reduce with decreased task demand. This is the first study investigating how both WMC and awareness affected people's ability to modulate inhibition with changing context. The implication about the impact of cognitive resource and implicit learning on inhibitory control was discussed.

Action and Perception in Aging: Taking Length as an Example

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Previous literature pointed out that aging does not affect the basic characteristics of the landing movement control during stair climbing. At the meantime, falling from stairs seems to be a common cause of physical injury among the elderly. We wonder if visual perception of and action on the same stair could dissociate somehow and bring potential conflicts in information when landing fails. Because landing movement is a three-dimensional and complex movement, in the current study we simplify the experiment and test participants on their accuracy in passive perceiving and active estimating a one-dimensional length. We tested twenty young and twenty elderly participants on their visual discrimination (perceptual) and limb emulation (motor) of one-dimensional length. The perceptual and motor tasks were carried out along three orthogonal axes in space, respectively, and the accuracies and precisions of responses were analyzed. The results indicated that accuracies of visual perception and manual estimation do not differ, but both differ from feet estimation. In addition, the elderly showed smaller standard deviation than the young group. Based on these results, we suggest that the elderly are more conservative in feet movements, and actually more stable in making length judgment than the young group. The current findings provide novel information regarding the characteristics in the input and output sides of the cognitive system.

First Impression from Postures in Different Viewing Angles: Effects on Attractiveness, Trustworthiness, and Dominance.

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Posture modulates impressions of a person. In daily life, we often try to improve our impressions by taking "good" postures particularly when others evaluate us (such as job interview and dating). However, it has not been empirically examined whether such attempts to modulate impressions are indeed effective and, if so, which impressions are modulated. Here we examined the above questions by having participants report first impressions from pictures where other persons took "good" or "bad" postures. We took pictures of 16 persons from 3 viewing angles (front, side, back) while they were standing in "good" and "bad" postures. They were free to define "good" or "bad" postures and no other instruction was given. In total, 96 posture stimuli (2 postures x 3 angles x 16 persons) were prepared. Thirty-five participants were separately recruited and asked to report how the person in each picture appeared attractive, trustworthy, and dominant by using a 5-point Likert scale. The attractiveness, trustworthiness, and dominance judgment tasks were performed in separate sessions. The order of stimulus presentation was randomized within each block. We found that: (1) The persons in "good" postures were generally rated more attractive and trustworthy but dominance did not change with postures. (2) The improvement of attractiveness and trustworthiness were observed with the all angles. (3) The changes in attractiveness and trustworthiness were larger and more variable with the side view than the front and back views. Evidently, by taking intuitively good postures, people can improve attractiveness and trustworthiness but the changes in impressions depend on the viewing angles. These findings imply that people naturally know how to improve attractiveness and trustworthiness by taking "good" postures in the front view (and perhaps consequently in the back view) but know less in the side view.

Can L2 Immersion Environment Reverse The Negative Transfer from L1? A Case of Mandarin and Taiwanese

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"The influence of the first language (L1) on the acquisition of the second language (L2) is an issue of importance. A well-known example of negative transfer is that Japanese speakers who learn English as a L2 often have difficulty in hearing and producing /l/ and /r/ accurately. Such negative transfer Taiwan is an abundant environment with multiple languages coexisted. It provides a ground for investigating whether a L2 immersion environment can reverse the negative transfer from L1. Among other phonetic contrast, a salient mismatch between Mandarin and Taiwanese is on retroflex ㄓ(zhi)、ㄔ(chi)、ㄕ(shi-) and nonretroflex ㄗ(zi)、ㄘ(ci)、ㄙ(si). The retroflex is absent in Taiwanese. We investigate the issue mentioned above by examining negative transfer at speech perception in Taiwanese-Mandarin bilingual adults. The participants recruited were college students with proficiency in Mandarin. They were assigned to either Mandarin monolingual group (MMG) or Taiwanese-Mandarin bilingual group (TMG), according to a Taiwanese vocabulary test and a language experience questionnaire. All participants were asked to perform a phoneme discrimination task in which five phonetic contrasts (stop, fricative, affricate, nasal, retroflex) of Mandarin were included. The results revealed that comparing to MMG, participants in TMG show a selective difficulty in discriminating retroflex but not other phonetic contrasts. This evidence supports a negative transfer between Taiwanese and Mandarin happened along with the language development of individuals. Moreover, although an immersion environment can improve proficiency in L2, it failed to reverse the negative transfer on L2 speech perception.

The Different Level of Consciousness in 3D Stereopsis Vision

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"Stereopsis vision proof that without 2D form cues, human eye can see 3D through binocular fusion cues only. What is the mechanism of binocular matching? The stereoscopic matching is a very interesting unconsciousness processes. We know it's very fast as milliseconds. Will it be possible even in this short time, there is already have some kind of subconscious or conscious there? Purpose: The study try to manipulate different cognitive levels of 2D cues in stereoscopic 3D vision to see the influence of cognitive cues for 3D formation. Hope the results of this study can give some idea about if an unconscious process (binocular matching) have levels of consciousness involve. And through reaction time can we measure the different level of consciousness effect or not? Methods: First we manipulate the form cues: with 2D form and without 2D form. The 3D depth cues embedded in stereopsis vision, so the 2D and 3D cues might be same or different. The second manipulation of experiments is the instrument to present the stimulus. We use two ways to present the stimulus. One is the bare eyes projection, and the other goggle glasses. The former one left and right eye's images are not superimposed. The later one two eye's images superimposed in the same place, so might see a little form cues there. Results & Conclusion: We find out that binocular matching is a gradual process. When 2D cues and 3D cues are the same, then the fusion time to perceive the 3D is not much different of no form cue, geometric form cue, and meaningful word cue. But when 2D cues and 3D cues are inconsistent, then this inconsistent influence is bigger than three levels of 2D form cues. So with from cues will help the processing of 3D fusion and recognition. But binocular 3D fusion with-form or without-form is also possible through different processing channel, without-form situation direct access by the zero-crossing matching channel, and with-form case is a kind of step by step serial processing. Which means the reaction time will not be longer of no-form than with form in 3D vision. We also found two ways of presentation the stimulus (bare two eyes projection / goggle glasses) has only little difference.

Efficacy of a Learning Opportunity that Included Actual Activities for Learning to Use Smartphones among Older Adults.

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"In Japan, 20.5% of older adults use smartphones (MIC, 2016). The low utilization rate is thought to be the result of problems related to usability of smartphones and the few opportunities of learning how to use it. To improve the rate of smartphones utilization, it is necessary to clarify the problems associated with using smartphones and explore an optimal support for learning process. This study conducted a longitudinal usability test that required 16 older adults to use smartphones for 4 weeks. In addition, we examined the effect of learning by undertaking actual activities.The participants were divided into two groups: intervention (N = 9) and control (N = 7). All participants participated in the usability test twice (at first and last week). In the second week, the intervention group participated in the lesson that allowed them to take pictures in the garden; this was followed by printing the same and making a portfolio using these pictures in the second week. The control group only participated.
The log data suggested that the large individual differences were recognized in the use time and the number of use, irrespective of the group. However, the intervention group tended to spend more time on the application used in lesson. Further, the results of the usability test indicated that the intervention group performed better than the control group. While analyzing

the daybook, differences between the two groups were not observed in the various newly discovered functions. However, the text mining analysis revealed that the description of the function related to the photograph as being more frequent in the intervention group.
In the future, it is necessary to examine factors that are contributing to individual differences in the learning process. Moreover, the learning opportunity provided through actual activities seemed to have an effect on promoting learning.

Gender Differences in Impression Evaluation of 3D Shapes of Liquid Soap Bottles

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This study investigated gender differences in subjective impression evaluations of shapes of 3D products. As a typical example of 3D product design, we focused on the shape of liquid soap bottles. Since the relation between shapes and evaluations is nonlinear, clarifying exactly what components of shape designs females and males are evaluating is not easy. We developed an analytical framework to investigate these gender differences by using a combination of spherical harmonics (SPHARM) and conditional autoregressive (CAR) modeling.
SPHARM is a parametric surface description that uses spherical harmonics as its basic function. To extract their major morphological features, we used SPHARM to convert 3D surface data on the shape of 22 liquid soap bottles into multivariate coefficients. Then, we performed a principal component analysis (PCA) of these coefficients. Extracted morphological features were related to the aspect ratio in the frontal plane, thickness, and roundness. Subsequently, participants rated their subjective impressions of bottle shapes on a semantic differential scale. We examined relations between bottles' major morphological features (i.e., PC scores) and their subjective impressions based on the CAR model, which is one of the spatial statistical models, using RStan package. We assumed that the relatively smaller the spatial correlation along a PC, the more attention was paid to the component in impression evaluation. Estimation results of random effects suggest that components of interest in impression evaluation of shapes differ between males and females.

Investigation of Pilots with Visual Induced Spatial Disorientation in the Helicopter Simulator

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Spatial disorientation (SD) is a temporary condition resulting from flying into poor weather conditions with low or no visibility. Under these conditions, the pilot may be deprived of an external visual horizon, which is critical to maintaining a correct sense of up and down while flying. Spatial disorientation is a critical issue for pilots during the flight. However, few pilot performance assessment monitors the pilot cognition and his behavior, and few studies have shown the EEG dynamics during spatial disorientation. In this study, we investigated the pilot's brain dynamics in a 3D simulated aviation environment to find out possible solutions of disorientation. By studying the EEG signals during the flight, we observed that there are no differences between subjects under normal condition. However, when entering clouds, pilots who eventually spatial disoriented and crashed in the flight simulator had a higher power of gamma band (31-50Hz) in frontal, parietal, sensorimotor cortex, and occipital. In addition, we found power desynchronization of gamma band in pilots without SD after entering clouds. On the contrary, we found power synchronization of gamma-band in pilots with SD after entering clouds.With our findings, we hope to provide good neurophysiological indicators, aim to provide better and safer flights.

Can Machine Realize Creativity Through Manipulation of Structures? A Logical Construction of Extraction and Manipulation of Musical Structures Using Deep Learning

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One of the mechanisms of human creativity is the manipulation of structures (Arthor, 2009). Music is an example of the manifestation of such creativity. Music has developed through manipulation of existing structure, which has brought into new structures used to compose new works. A representative case is the invention of whole tone scale. Debussy invented a scale with less tonality by applying laras slendro, a Javanese scale, to the structure of tonal scale in European music. Asking if making new works through the structural manipulation can be realized by a machine leads us to inquire into the essence of human creativity. In this research, we take music as a testbed, since it is well known that pieces of music have structures at various levels such as musical forms, tonality, chord, rhythm, and we expect the structural extraction and manipulation can correspond to machine learning. Let us consider deep learning as the machine for structural extraction. Deep learning for image recognition produced a hierarchical structure of features extracted at each layer (Le et al., 2012). We can design a deep learning machine where various structures in musical works are extracted and divided into multiple layers, by corresponding "features" extracted here to "structure" in our consideration of cultural creativity. Structural manipulation can be expressed by combining or exchanging layers among machines learning the musical structures. All the processing described here can be formalized and finally can be represented by one machine (algorithm). This means that structural manipulation as the characteristic of human cultural activity can be realized by an algorithm

using deep learning as its core mechanism. We will further be able to obtain some clues to understand the mechanism of creating new structures through manipulating existing structures by deeper investigation of the behavior of such algorithm.

Impact of Online-Game Players on Multitasking in a Virtual Environment

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Evidence has suggested potential cognitive skills training of extensive video-game playing, especially in eye-hand coordination and reaction time, spatial attention, divided visual attention, selective attention and attentional capacity, but the effective in multitasking ability is unclear. As the dramatic development of computer and internet, online-game playing has become a common entertainment in the current generation. Online-game players often do several tasks at the same time; often tasks interfere with each other and might increase mistakes. This study proposed to explore the relationships between online-game playing types and multitasking ability in a virtual environment, using Edinburgh Virtual Errands Test (EVET). In this study, 79 participants with mean aged from 20-30 years old were recruited. Chen's Internet Addiction Scale (CIAS), internet use questionnaire, EVET, working memory tests and resting fMRI were given to each participant. The results showed a positively association between multitasking ability and working memory (WM). No significant difference of spent time between MOBA and OGPs, showing both groups could be expertise in online-game playing. Three groups with varied online-game playing, multiplayer online battle arena (MOBA), other online-game players (OGPs) and no-players (NGPs) were compared with their EVET performance, WM and time spent of online-game use. The MOBA players had better performance on EVET plan follow and total score, and spatial memory than did other two groups, indicating a benefit of MOBA on planning following and increase the efficiency of multitasking. Using Cohe-ReHo analysis of resting fMRI showed significant association between both sides of temporal lobe, caudate, occipital lobe, anterior cingulate cortex and parahippocampus and EVET. In conclusions, online-game playing may provide a role in training multitasking and helps to maintain the planning. Multiplayers online game genres may benefit in participants' spatial memory. Several brain function activities were found, indicating collaboration among multiple brain areas involving in multitasking performance.

Behavioral Interaction between Electrically Evoked Pain and Itch in Humans

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"Both itch and pain are nociceptive sensations, but their interaction is unclear. In most literature, pain is suggested to inhibit itchy sensation, but it remains unclear whether the interaction between these two nociceptive sensations depends on the modality. To date, a few studies have documented this interaction but the majority of studies used different methods to evoke pain and itch. In the current study, we use electrical stimulation to elicit pain and itch and investigate their cognitive interaction. Our preliminary data showed that the degree of electrically induced itch did not differ under painful or non-painful stimulation, indicating that no significant interaction developed when both kinds of sensations were produced with the identical modality. Results obtained from this study will enhance our understanding about how human brain processes both kinds of nociceptive stimuli.

Therapist and Child Interaction: Nonverbal Communication in Pediatric Occupational Therapy

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This study aims to investigate the characteristics of effective interaction between a therapist and his/her child client with autism spectrum disorder during a session of pediatric occupational therapy. Pediatric occupational therapy, particularly with a focus on sensory integration theory, has been created to treat children with developmental disorders. The findings from quantitative empirical research that investigates the child-therapist interaction in effective treatment could be applied to clinical practice, as well as to training programs for novice therapists. A session between a child and a therapist, who had abundant experience as an occupational therapist, was video-recorded and analyzed. The child with autism spectrum disorder in this study was not able to take part in everyday conversations. The previous study that analyzed child's behaviors during the session reported that child's active involvement and adaptive behaviors toward the therapist increased across time. The present study analyzed therapist's nonverbal behaviors such as

direction of eye gaze, facial expression and vocalization, in order to investigate the characteristics of therapist's communication which supported occurrence of child's proactive involvement and adaptive behaviors. The videos of the session was viewed using annotation software (ELAN). We discuss the implication of the use of nonverbal communication during pediatric occupational therapy.

P3-1: Cognitive Neuroscience, Cognitive Psychology, Functional Brain Imaging, Brain, Learning, and Development

Sunday, September 3, 2017, 08:30 – 10:00 AM

Scrambled/'Floating' Numeral Classifiers in Korean: An ERP Study

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"This study examines the effects of scrambling either a subject or object associated with 'floating' numeral classifiers (FNCs) in Korean by using the event-related potentials (ERP) paradigm. The experimental materials consisted of 360 sets of 6 items, which vary in terms of three factors such as (i) the grammatical role ((S)ubject vs. (O)bject) that FNCs associate with, (ii) the type of Case/particle marker on FNCs (Case-less vs. (N)om/(A)cc Case-marked vs. (F)ocus-particle-marked), and (iii) the application/non-application of subject or object scrambling, as schematically represented below. i) S-related Case-less FNC: [park-in dog-Nom bread-Acc 2-FNC ate] I heard. ii) S-related N-marked FNC: [park-in dog-Nom bread-Acc 2-FNC-Nom ate] I heard. iii) S-related F-marked FNC: [park-in dog-Nom bread-Acc 2-FNC-Foc ate] I heard. iv) O-related Case-less FNC: [park-in bread-Acc dog-Nom 3-FNC ate] I heard. v) O-related A-marked FNC: [park-in bread-Acc dog-Nom 3-FNC-Acc ate] I heard. vi) O-related F-marked FNC: [park-in bread-Acc dog-Nom 3-FNC-Foc ate] I heard. Using the materials, we investigated the following three questions. First, is there a difference between effects of in-situ and scrambling options on FNCs? Second, is there a contrast between the in-situ and scrambled objects? Third, is there a distinction between the subjects in object-scrambling and object-in-situ sentences? We found that, first, the Caseless FNCs in sentences involving subject or object scrambling elicited P600 in comparison to the corresponding ones in sentences without such scrambling, whereas the Case-marked FNCs in the former case were ERP-wise not significantly different from the corresponding ones in the latter case. By contrast, the F(ocus-particle)-marked FNCs in sentences involving scrambling elicited P600 for subject or N400 for object in comparison to the corresponding ones in sentences without scrambling. We attribute the P600 effects here to a second-pass, revised integration process that now attempts to correctly link the Case-less/F-marked FNC to the relatively more 'distant' scrambled subject or object associated with it. Second, the scrambled objects induced reduced N400 effects relative to the in-situ ones. This result is unexpected, given that the canonical word order in Korean is SOV, predicting that scrambled objects will incur more processing loads. But one crucial feature of Korean is that this language allows pro drop or null subject argument for subjects. Thus, the object-initial sentences were not perceived by the Korean users as marked/exceptional in terms of word order. Third, the subjects after the scrambled objects were not differentiated from the ones before them in terms of ERP responses. Note that the former involve object scrambling, while the latter do not. Since the subjects do not involve scrambling in either type of sentences, no difference between them is an expected result. Overall, we take all the three results above to render neuroelectrophysiological evidence that our mind actively detects scrambling or permutation of word order in the course of sentence-processing FNC-associated scrambled subjects or objects."

Being an Expert Reflected by Structural Connectivity: A Tractography Study on Mathematical Expertise

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"Hierarchical processing – the ability to establish embedded representations, with elements at superordinate levels persisting while elements at subordinate levels are processed – is a key concept in various domains such as language, music, action and mathematics (Jeon, 2014). Notably, processing mathematical hierarchy is marked by an expertise-dependent functional modulation: While experts recruit a set of core regions, non-experts rely on broader activation around left frontal and parietal areas (Jeon & Friederici, 2016). These differences are related to more controlled, effortful processing in non-experts compared to automated, less demanding processing in experts (Neubauer & Fink, 2009). However, little is known about structural correlates of automatic mathematical processing. The current study seeks to explore how varying degrees of automaticity in processing hierarchical arithmetic expressions are reflected in connectivity profiles of relevant areas. We performed probabilistic tractography (Behrens, 2007) from regions commonly activated in both groups when processing hierarchical compared to linear algebraic structures: left Insula, left precentral gyrus (lPCG), left superior parietal lobule and bilateral medial pre-motor cortex (rMPC,lMPC; Jeon & Friederici, 2016). Our study adds empirical evidence from the viewpoint of structural connectivity, suggesting that connections to thalamic areas support more demanding processing. Individuals relying on more automatic processing showed higher connectivity of lPCG to temporal brain areas via left arcuate fasciculus and superior longitudinal fasciculus (AF/SLF). These

structures are associated with hierarchal processing in language (Friederici, Bahlmann, Heim, Schubotz & Anwander, 2006), a highly automatic process in adult language users (Schneider & Chein, 2003). Therefore, we suggest a critical role of the left AF/SLF for hierarchical processing - specifically at high degrees of automaticity - be it in language or mathematics.

Social Intelligence in Neuropsychological Context

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This study aimed to describe the social intelligence in neuropsychological context. Neuropsychology associated with the brain physiology and human behavior. The complexity of brain physiology modulates the high varieties of human behavior in society. The diversity of behavior in society led a social appraisal. This study help us to be aware in distinctive behavior that perceived by society. Using systematic review, we found that the physiology of brain leads intelligence in social context. Social intelligence need to be learned in social penetration. Impairment in social life means that there's an abnormality in the physiology of brain. Brain plasticity is a key term to increase the ability in social skills. Nowadays, psychological intervention needs to stimulate the plasticity of brain development certainly in social impairment disability. Gaining the social intelligence means gaining the social acceptance.

Increased Brain Network Efficiency not Always Enhance Creativity: Dual-Process Accounts of Human Connectome and Creative Problem Solving

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Human brain is a connectome. More and more research focused on the relationship between brain network and creativity. Creativity is a multiple concept, with various measurements we can see its corresponding cognitive processes, and therefore, different creative problems shall connect with its own brain network structures. Present study aims to discriminate the relationship between connectome with divergent thinking insight problem solving using topological properties of white matter. By method of graph theoretical analysis for 66 adult, we compares efficiency of white-matter connectivity network for divergent thinking performance and insight problem performance. Results show that efficiency of information transmission between brain regions is significant to creativity tasks. In particular, divergent thinking only requires several brain regions cooperation to develop novel ideas, insight problem solving involves with cooperation of more brain regions to restructuring representation of problem and break the impasse. Global efficiency of white-matter connectivity network has total different influence mechanism for divergent and convergent thinking process. Present study is first to support the dual-process theory of creativity with structural brain images perspective.

Reduced Leftward Lateralization of P600 Responses in Syntactic Category Processing in Healthy Older Adults

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It has been shown that cognitive tasks (such as memory, perception, and inhibitory control) that involve processes biased toward one hemisphere in younger adults tend to engage both hemispheres in healthy older adults. However, whether the additional activities from the other hemisphere index processes similar in nature or help compensate for the overall cognitive decline is still not well understood. In view of that, the present study used well-characterized event-related brain potential components—N400 and P600, to investigate age-related differences during syntactic processing, one of the best-known examples of functional lateralization. Twenty-eight younger and 32 older adults participated; all were healthy, right-handed, and without familial sinistrality background. Participants viewed two-word phrases presented word by word on a screen, with the target words presented laterally to either visual field (VF), matching or mismatching the syntactic category expectancy created by a preceding central cue (e.g., Grammatical: liǎng-dòng fáng-zi "two houses"; jí-shí bang-máng "to immediately help". Ungrammatical: jí-shí fáng-zi "immediately house"; liǎng-dòng bang-máng "to two help"). Participants judged the grammaticality of the phrases with button-press responses. Our findings replicated prior research in showing that, relative to grammatical targets, ungrammatical targets elicited a reliable P600 grammaticality effect only with right VF (left-hemisphere-biased) presentation for younger adults. However, for older adults, reliable P600 grammaticality effects were found with both VF presentations. Both younger and older adults showed additional bilateral N400 grammatical effects. In addition, regardless of VF presentations, older adults were significantly less accurate than younger adults, revealing a reliable negative linear relation between older adults' age and their accuracy. Our findings thus add to the literature showing hemispheric asymmetry reduction in older adults. Furthermore, the additional right hemisphere activity in older adults during syntactic category processing reflects qualitatively similar processes subserved by the left hemisphere; however, provides no evidence for

successful compensation.

Familial Sinistrality Modulates the Degree of Left-Lateralization of the P600 Responses During Syntactic Category Processing: Cross-Linguistic Evidence from Chinese

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Although structural analysis in syntactic processing is predominantly subserved in the left hemisphere (LH) in healthy young adults, prior studies have shown that the right hemisphere (RH) is capable of initiating processes similar in nature. The degree to which these structural processes are left-lateralized has been shown to be sensitive to several factors, including the family history of left-handedness (familial sinistrality; FS). In keeping with imaging findings showing less structural asymmetry in the brain in individuals with FS background (FS+), it has been shown this population also tends to show less lateralized syntactic processing. These prior studies were conducted exclusively using Indo-European languages. As processing of different languages may involve non-identical lateralization patterns, the present study aims to provide cross-linguistic validations using Chinese. 25 FS+ and 28 FS- young adults were tested; all were right-handed. Participants viewed two-word phrases presented word by word on a screen, with the target words presented laterally to either visual field (VF), matching or mismatching the syntactic category expectancy created by a preceding central cue (e.g., Grammatical: liǎng-dòng fang-zi “two houses”; jí-shí bang-máng “immediately help”. Ungrammatical: jí-shí fang-zi “immediately house”; liǎng-dòng bang-máng “two help”). Participants judged the grammaticality of the phrases by pressing response buttons. Consistent with past findings, we found a reliable P600 effect (600-1100 ms) modulated by both VF or FS background—with reliable effects from only RVF (left-hemisphere biased) presentation for FS- participants but from both VF presentations for FS+ participants. Also consistent with past findings, we found the N400 grammaticality effect (300-600 ms) not modulated by either VF or FS background. These results thus provide cross-linguistic validations for the role of familial sinistrality on functional lateralization in the brain and additional support for the capability of the RH to perform qualitatively similar syntactic processes as does the LH.

Linking White Matter Integrity to Hemispheric Processing of Syntactic Category Information - an ERP and DTI Study

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"Syntax is one of the most unique aspects of human language abilities and has been shown to be associated with two white-matter tracts in the brain—the superior longitudinal fasciculus (SLF) and the uncinate fasciculus (UF). Previous studies used functional measures that had limited ability to tease apart different aspects of syntactic processing. In view of this, we used two well-characterized event-related potential (ERP) components—P600 and N400, to investigate different subtypes of syntactic processing (structural analysis vs. lexical-semantic restrictions, respectively). There were 16 right-handed young adults without familial sinistrality participated in this study. We recorded participants’ ERPs while they viewed two-word phrases presented word by word on a screen, with the target word presented laterally to either visual field (VF), matching or mismatching the syntactic category expectancy created by a preceding central cue. Participants judged phrasal grammaticality with button-press responses. Consistent with prior research, participants elicited an N400 grammaticality effect with both VF presentations, but a P600 grammaticality effect with right VF (left-hemisphere-biased) presentation only. Diffusion Tensor Imaging (DTI) data were collected from the same participants, and fractional anisotropy (FA) value computed for syntax-related tracts (left and right SLF1, 2, and 3, and UF) and corpus callosum (CC). Correlational analyses revealed that larger overall magnitude of the RVF/LH grammaticality effect (summing over the N400 and P600 time windows) was associated with higher FA in the anterior part of the CC (CC_genu) and left SLF1. Critically, the above associations with SLF integrity were driven by individual variations in N400 responses, such that participants with higher left SLF1&2 FA values showed larger N400 responses. Our findings extend the current literature by showing that the SLF is also sensitive to more lexical-semantic associated aspects of syntactic information processing.

BCI Learning and Time-on-Task Effect on Beta Rebound Phenomenon

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After imagination of hand movements a short lasting EEG activity in beta band is usually reported as part of the event related synchronization mechanism (i.e. ERS). We

tried to investigate how training and prolonged usage affect beta rebound phenomenon of a Motor Imagery (i.e. MI) based Brain Computer Interface (i.e. BCI). Participants were eleven male students in age range 22-27, all right-handed. At the beginning we recorded untrained MI subjects than, after two weeks of training we acquired data from same subjects. In our study we used BCIGEM a videogame that embodies BCI paradigms. We used a videogame because MI literature suggests that a rich visual representation of the feedback signals may enhance the learning progress in BCI tasks. In addition a videogame with appealing graphics stimulates participant attention and increases motivation. We measured beta rebound ERS at a peak around 22.95Hz during left motor imagery and at 21.48Hz for right motor imagery. These values are compatible with literature that reports peaks at 23.5±2.5 Hz for left MI and 22.7±0.7 Hz for right MI. Statistical tests returned a significant p values for untrained-trained difference of ERS beta peaks in left $t(13)= 5.7051$, $p<0.05$ and right $t(13)= 8.2305$, $p<0.05$. In same trained subjects we also checked the effect of one and half hour continuous BCI usage. In trained subjects we interpreted this time-on-task effect as a correlate of mental fatigue. Difference between initial session and session recorded at the end of BCI in trained subjects was significant on beta rebound frequencies for left $t(13)= 3.0475$, $p<0.05$ and right $t(13)= 4.8955$, $p<0.05$. According to our findings Beta rebound ERS seems a frequency band able to characterize neurophysiological correlates of learning and mental fatigue.

An Integrated Approach Toward the Understanding of Affective Influences on Reward-Based Decision Making In Patients with Schizophrenia

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Deficits in emotion recognition and decision making are two of the signature symptoms in schizophrenia. Studies have shown that patients are less accurate in recognizing faces with negative emotions than with positive ones, especially for the fearful and angry expressions. On the other hand, the updated reward prediction error (RPE) – a discrepancy between the predicted and actual action outcomes – is thought to be encoded by dopaminergic neurons, and the dysregulation of dopamine systems in schizophrenia has been suggested to alter the appraisal of stimuli, leading to the abnormalities in reinforcement learning and decision making. These two deficits, however, have seldom been incorporated together into clinical study. Accordingly, this study aims to investigate the impact of emotional experience on decision making in schizophrenia. Specifically, building on our previously established paradigm, we took three basic facial expressions – neutral, anger, and happiness – as the affective primes inserted into a probabilistic gambling task, and examine their impact on choice behavior. In addition to conventional behavioral statistics, a reinforcement learning model was adopted to fit the participants' trial-by-trial choice data to assess their latent process involved in the task. Moreover, EEG recordings were implemented throughout the experiment to obtain the activities related to facial perception, affective arousal, and RPE signaling. For healthy controls, both anger and happiness facial primes elicited higher level of affective arousal than the neutral ones, and led to elevated RPE signaling, rendering the participants to update expected values more frequently and make more exploratory choices. Conversely, in schizophrenic patients, the baseline of RPE signaling was contingent to their symptom severity, and, importantly, only the happiness facial prime yielded significant modulatory effect on choice behavior due to patients' less-accurate recognition to negative emotions. Findings of this study shall contribute to our understanding of the mechanism underlying affect-elicited decision making in schizophrenia.

Aging Effects on Salient Capture and Perceptual Grouping in Visual Search

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In visual search, usually a salient object attracts attention. For instance, if a target was on a bar with unique orientation (i.e., salient capture), response is faster than if the target was in a homogenous background. However, our previous studies found that if the target was on a salient collinear object, overlapping takes longer than non-overlapping (ie., collinear masking). Recent studies suggested that aging decreases perceptual grouping ability on good continuity. The goal of this study is to explore the effect of aging on salient capture and collinear masking effects in our specific search display. A total of 28 participants, including 16 young adults (mean age 23.8) and 12 old adults (mean age 74.1), joined in this study. To enlarge search display and to reduce task difficulty for old participants, we magnified the search display by 1.5 times and reduced number of elements from 21 x 27 to 9 x 9 bars. Additionally, the possible locations for distractor and target are reduced from 7 to 3. Participants were required to discriminate the orientation of a target (a slat black bar). The results showed that with 9-bars collinear distractor, both age groups showed significant slower responses in overlapping (old 1190 ms, young 562 ms) than non-overlapping conditions (old 910 ms, young 530 ms). When the trials were with 1 horizontal bar, only old adults showed significantly faster response in overlapping (919 ms) than non-overlapping conditions (990 ms). We argue that the lack of salient capture effect for young adults might be due to less saliency in a sparse display. The preserved collinear masking effect for both age groups

suggested that aging did not influence the ability of perceptual grouping on collinearity.

Shared and Non-shared Neural Mechanisms in Processing Dynamic Transformation of Expression and Pose in Faces: An fMRI Study

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Transforming novel faces into familiar ones requires overcoming variations in expression and pose, among others. Our previous studies have shown that multiple exposures coupled with sufficient variation in either expression or pose can lead to robust recognition and significant generalization (Shyi & He, 2011; Shyi & Lin, 2014; Cheng & Shyi, 2014). During normal social interactions, variations in both expression and pose unfold dynamically over time. However, the nature of dynamic changes between them is not the same. Variations in expression typically entail combinatory changes of facial muscles for expressing different emotions, and those in pose typically entail rigid head rotation along biologically constrained trajectories. This consideration suggests that while both embody dynamic alterations, there might be non-shared aspects in their underlying brain mechanism. Here we examined the extent to which brain mechanisms that are shared and non-shared between processing of expression and pose. Participants performed a one-back task judging whether the identity of the currently viewed face was the same as the immediately preceding one. They made the judgment while viewing sequences of animation portraying variation in expression or in pose. Structural and functional images of brain regions selective for face processing were acquired using a GE MR-750 3T scanner. The results showed brain activations for viewing faces underwent expression and pose transformation were greater than that for viewing scrambled controls. Moreover, no significant difference between expression and pose processing in activation for areas subsumed the core (FFA, OFA, pSTS) and extended system (MT/V5) of face processing. However, a difference in activation in a brain region along the dorsal route suggests that it was more selective for processing pose than for processing expression. Together, these findings underscore the shared and non-shared mechanisms for processing of dynamic transformation that may play important roles in transforming novel faces into familiar ones.

Is the Neural Inversion Effect in Human FFA a Reliable Index of Face Processing?

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Introduction: Face recognition is one lasting and intriguing topic in visual neuroscience, and its most associated brain area, the “Fusiform Face Area” (aka. FFA), has been shown to be responsive more to upright than inverted faces, a “neuronal inversion effect (NIE)”. Brants et al., (2011) suggested that the significant NIE in FFA, both before and after Greeble training, was an indication of participants treating Greebles “face-like” throughout the training. Upon close examination, we found that the different training protocol (Gauthier et al., 1997, Vision Res., 37(12), pp. 1673-82; vs. Gauthier et al., 1998, ibid., 38/15, pp. 2401-28), and the 1000ms vs. 500ms RT difference (in verification task), may confound the disparate fMRI results between Gauthier et al., (1999) and Brants et al., (2001).
Methods: In order to investigate the effect of training protocol, in the current study we trained 16 (currently 12) Greeble experts, 8 (/6) in each training protocol, with either Gauthier97 or Gauthier98 paradigm, in between the NIE and localizer tasks. In addition, the extant literature (11 papers) with the similar FFA-NIE reports have also been extracted for meta-analysis as comparison.
Results: The basic training performance (session-wise accuracy and RTs) mimicked both Gauthier97 and Brants01, suggesting successful replications. Intriguingly, in both Gauthier97 and 98 training regimes, the average of participant’s NIE@FFAbefore and NIE@FFApost were both insignificant (for both faces and Greebles), in sharp contrast to results in both Gauthier99 and Brants01. To put our fMRI results in larger perspective, the meta analyses across 11 studies with similar NIE@FFA also suggested that NIE (a) may not be a consistent index for face-related processing in the FFA; (b) its small aggregate p came from few studies with very small p-values; and (c) overall, the aggregate effect sizes across studies was also insignificant (Cohen's d= 0.596; effect-size r= 0.285). These results would be more implicative given the inevitable significance-selection biases (or the file-drawer problem).
Conclusions: With our successful behavioral replication of Greeble training, we found that the specific training paradigm did not matter in NIE@FFA, as in both Gauthier97 and 98, effects were both insignificant both before and after training. After comparing with the meta-analysis results, we conclude that NIE may not be a good index of face-related processing in FFA. In light of the rising concerns about the replicability in cognitive neurosciences (e.g., Szucs and Ioannidis, 2016, doi: http://dx.doi.org/10.1101/071530), the present study helps empirically in such endeavor.

Asymmetric Cortical Activity Pattern for Auditory Mismatch Negativity Response in Patients with Schizophrenia

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Schizophrenia is a psychiatric disorder accompanied by hallucinations and delusions, which is characterized by a decrease in mismatch negativity (MMN) response against a deviant sound stimulus during continuous tone stimulation. We used source localization technique of duration deviant MMN responses and investigated difference in cortical representation of the unconscious auditory-memory processes in 79 schizophrenia patients and 88 healthy volunteers. All data were collected with a 32-channel electroencephalograph system in National Taiwan University Hospital. Channel-based ERP analysis confirmed a statistically significant decrease in MMN peak amplitude in the patient group. Regional brain activity for MMN was determined by Multiple Sparse Priors method and statistical test was performed on the obtained source distribution of MMN. A 1-sample t-test (FWE corrected, $p < 0.05$) within each group showed that the number of common-activated voxels within the auditory-related regions such as superior temporal area (BA 22) and primary auditory cortex (BA 41) was smaller only in the left hemisphere of the patient group. In addition, the patient group showed a significantly augmented cortical activity over the control group in the auditory-related vicinal regions of the left hemisphere, such as the middle temporal area (BA 21) and the temporal pole area (BA 38). These results suggest that the cortical regions responding to auditory memory-processing have a wide individual variety in patients especially in the left hemisphere. The auditory processing in these distributed and asymmetric cortical areas might cause decrease in MMN amplitude in patients.

Performance in The Delayed Color-Estimation Task is Correlated with Alpha and Beta-Band Activity Across The Whole Brain

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There have been intense debates on whether the capacity of visual working memory (VWM) is limited by a small set of discrete slots with high precision, or by a pool of resources that can be flexibly distributed to various items. Previous studies on the issue were mostly based on behavioral modeling, and precision of VWM was measured by the response distribution over a continuous physical scale. However, underlying electrophysiological mechanisms to the behavioral parameters remained unclear. In this study, a delayed color-estimation task (Bays, Catalao, and Husain, 2009; Zhang and Luck, 2008) was applied along with electroencephalogram (EEG) recording. Four parameters were estimated according to performance on the task: precision, the probability of correctly remembering items (pT), the probability of random guessing (pU), and the probability of mismatching a non-target color (pNT). Since conventional EEG analysis methods were constrained by nonlinear and nonstationary assumptions, a new approach combining Hilbert-Huang transform (HHT; Huang et al., 1998) and ensemble empirical-mode decomposition (EEMD) was applied for EEG data analysis (e.g. Chang et al., 2016). Taking the target-only condition as baseline, results showed the following: (i) As the number of to-be-remembered items increased, there were decreased alpha- and theta-band activity during memory retention stage, and decreased alpha- but increased theta-band activity during memory retrieval stage across the whole brain. (ii) pT was positively correlated with alpha-band activity throughout the retention and retrieval stages across the brain. (iii) pU was negatively correlated with alpha-band activity during retention and retrieval stages, whereas pNT was negatively correlated to theta-band activity only in the retrieval period. These patterns of results were consistent with previous studies in the negative correlation between alpha oscillation and memory load, and the positive correlation between theta oscillation and successful memory retrieval (e.g. Chen and Caplan, 2016). We will also discuss these results in the framework of event related potentials such as: N2PC, SPCN for their corresponding cognitive processes measured with the task.

Perceptual Expertise Predicts Both Gray Matter Thickness and Density in the Human Fusiform Gyrus: A Cross-Country MRI Study on Bird Experts

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Previous fMRI studies have identified mid-fusiform gyrus as a key region in the functional network of perceptual expertise. In one recent study, cortical thickness (CT) of car experts' Fusiform Face Area (aka FFA) were correlated with their face and object (car) performance [McGugin, et al. (2016) JoCN 28, pp. 282-294]. To both extend this finding from car experts to experts of other domain, and also expand the CT and cortical volume (via volumetric brain morphology, or VBM), in study1 we reanalyzed our previously acquired birder T1-weighted Siemens 1.5T MRI data (N=27 Caucasians, 17 bird experts, and 10 novices), with both audiovisual and visual dprimes as their expertise measure. The results showed that significant correlations were found in both voxel density and CT between both audio and visual d', especially in bilateral fusiform gyrus, dorsal anterior and posterior cingulate gyrus, hippocampus, parahippocamous, etc. After partialling out the age confound, controlling for the high correlation between expertise and age, these results still hold. In study2, we corroborated the similar results with the 1.5T Philips T1-weighted MRI data (N=20, 10 local birders, with only visual dprimes) acquired in Taiwan. Lastly, the joint analyses combining both America and Taiwan data (N=47) showed that the left fusiform gyrus remained highly correlated, further strengthening the role of FG in

expertise. Despite of slight disparities, the brain regions are overall highly similar across VBM- and CT-expertise correlations, not only extending the previous CT-expertise in car to bird experts, but also expanding the CT-expertise to VBM-expertise correlations, deepening the interconnection between experience and brain structure.

The Analysis and Comparsion of Cortical thickness and Brain Volume: Musicians and Nonmusicians as Case

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In recent years, the study of cortical thickness and volume in various age groups and typical/atypical populations has become an important aspect of developmental and clinical neuroscience, offering insights, assessment, and recommendations about brain plasticity. While the numbers of these publications are ever-growing, the reports with both thickness and volume analyses are scarce. Therefore in this study, we sought to establish their relationship in a well-controlled musician vs. non-musicians (N=16 in each group, age-matched 20-25 yrs, with musicians having > 10 hours of regular practices per week and passing both the visual note memory task and >.80 accuracy criterion of auditory consonant/dissonant tests, whereas non-musicians were without any training and performing both tasks at chance level). Their T1 MRI data were acquired and analyzed by BrainVoyager QX (for thickness) and SPM-CAT12 (for volume), and their group-wise differences were assessed both qualitatively and quantitatively.
Our findings indicated that the brain areas related to professional musical training showed significant thickening and size increases in musician than non-musician group, including frontal, parietal, and temproral lobes, which conform to the conclusions drawn in earlier and similar studies. The most intriguing part is that while the qualitative method yielded decent (~70%) comparable results between cortical thickness and brain volume findings, the quantitative overlap index of similarity fared as low as .5%! Lastly, we offer some speculations about the reasons behind these disparate and less-addressed results, and await more cross-software and cross-preprocessing comparisons for further insights.

Modulation of Early Emotional Processing by Menstrual Pain in Primary Dysmenorrhea: An MEG Study

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Mood and anxiety disorders have been reported to associate with chronic pain. Our recent fMRI study suggests that women with primary dysmenorrhea (PDM) develop functional reorganization with a network shift from affective processing of salience to the cognitive modulation of pain. Here, we aimed to further investigate whether early emotional processing is modulated by long-term menstrual pain, both in the presence and absence of menstrual pain in PDM. We recruited 72 right-handed PDM subjects (PDMs) and 76 age-matched otherwise healthy women (CONs) during menstruation phase (MENS; Day 1-3) and periovulatory phase (POV; Day 12-14). Psychological inventories and pain experience were collected. Neutral, happy, sad, and angry voices stimuli were used to collect event-related MEG data. Source analysis using the beamforming method within theta activity (4-8 Hz) was performed for estimating cortical responses at 80-150 ms after stimulus onset. Brain emotional response indexes (BERIs) were calculated as the percentage change of theta activity of each emotion to that of neutral prosody. Statistical analyses with repeated measures models including factors of group, phase, emotion, and their interactions were performed.
PDMs reported lower quality of life, higher anxiety, personal emotional adjustment problems, and pain catastrophizing than CONs. During MENS, comparing to CONs, PDMs showed increased BERIs to sad prosody at brain regions of the left parahippocampal, fusiform, hippocampus, amygdala, and middle and superior temporal pole and to angry prosody at brain regions of the bilateral cuneus and precuneus, and decreased BERIs to angry prosody at the left STG and right IFG. In contrast, during POV, comparing to CONs, PDMs only showed significant decreased BERIs both to sad prosody at the right OFC and ACC and to angry prosody at the right precentral, postcentral, SMA, IFG, and dlPFC. To conclude, our findings suggest that personal experience with long-term menstrual pain would shape the function and connectivity within networks in central processing of emotional perception and could eventually impact women's long-term health."

Theta Activity at Pain-Free State is Associated with Self-Report Pain Scale in PDM

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Increase of theta oscillation has been reported in patients with severe and chronic neurogenic pain, which is localized in the cortical pain matrix. Most of these studies focus on brain state under painful condition. Our recent studies indicate dysfunctions of neural networks in women with primary dysmenorrhea (PDM) even under non-painful state. Here we further examined the effect of cyclic menstrual pain experience on theta activity across the menstrual cycle. Forty-one PDM women and 41 healthy female controls (CON), a subset of the participants from our previous PDM studies, were included. The magnetoencephalographic (MEG) signals with 3-5 minutes of eye-open resting state were recorded using a 306-channel MEG system (Vectorview, Elekta-Neuromag) during their 1st-3rd (menstrual phase, MENS) and 12th-16th day (periovulatory phase, POV). All subjects were assessed with a standardized clinical evaluation protocol including gynecological examination and psychological assessments. The source image of theta oscillatory activity for each individual was estimated using the beamforming approach. Whole-brain voxel-wise two-sample t-tests were performed for group comparison ($p<0.01$ uncorrected; cluster size $k>50$ voxels) of each phase. Further statistical analyses, including spearman's correlation and regression, were conducted between psychological/pain experience assessments. Our results showed that PDM exhibited increased theta oscillation in the left pre/post-central gyri (primary sensorimotor cortex) during the POV phase compared with those during the MENS phase ($p=0.001$), where the activity of this region was correlated with the state anxiety only in the MENS phase ($p=0.015$) but not in the POV phase ($p=0.816$). The results also showed the increased theta activity at the left middle cingulate cortex (MCC) of PDM, compared with CONs, during the MENS phase. The regression results demonstrated that in PDM group the MCC theta activity at the POV phase was a possible predictive factor for self-reported pain rating index ($p=0.038$). These findings suggest that theta activity of sensorimotor and MCC may play a role of adaptation in pain processing through the menstrual cycle. These should contribute to a better understanding of interplay between brain regions of affective-cognitive functions affected by long-term menstrual pain experience in PDM.

An ERP Study of the Retrieval Orientation of Neutral Pictures Embedded in Emotional Contexts

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Retrieval orientation refers to the cognitive operations that bias the processing of retrieval cues for a specific retrieval target. This study examined whether different retrieval orientations are adopted for neutral items encoded in neutral and emotional contexts. In three study-test cycles, participants were first presented with pictures of neutral objects embedded in emotionally neutral, negatively valenced, and positive valenced background scenes, respectively. They then made old/new judgments to the objects without the background scenes. The ERPs associated with the correct rejections were examined. We found two sets of retrieval orientation effects, one related to arousal and the other related to valence over the frontal scalp region. These retrieval orientation effects reveal the modulation of emotional context on the subsequent retrieval.

An EEG Analytic Framework of Detecting Choices In Manual Motor Imagery and its Potential Application in Bidirectional Information Sharing Between Human and Machine

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The current study serves as an initial stage to build a system in which machines and the human brain interact reciprocally to harness the computation power of the brain for online direction of machine movements. We adopted motor imaginary based BCI to predict the intended side of an "imagined" hand movement in response to visual cues. During the training phase, we presented 120 visual cues that were randomly interleaved to indicate left and right hand movements in each trial. Each visual cue was displayed for 4000-ms, followed by a 1500-ms fixation cue and a 4000-ms resting period. The participant was required to constantly imagine hand movement throughout the 4000-ms display of visual cue. To build a machine learning architecture in automatic detection of implicitly intended movements, we implemented Common Spatial Pattern (CSP) for EEG spectral feature extraction and linear discriminant analysis for MI classification. While the EEG signals were collected from 32 channels, we managed to reduce the number of channels in the data processing to four while still maintaining high accuracy at an average of 85% for five different participants for training session data using 5–fold cross validation process. In addition, we tested our BCI system with a second data set recorded from a participant using synchronous BCI protocol streaming off line to the system, which showed a 92% high accuracy classification. We will discuss how this EEG data acquisition and analytic framework can be applied to integrate external environment information with the processing of native sensory modality (i.e., sensory addition), and thus serves as a close loop information sharing system that may assists the machine to carry out appropriate actions in the environment at either conscious or subconscious level.

Investigating Vocal Emotion by Graph Theoretical Analysis and Lobe-dependent

Convolutional Neural Network on Functional MRI

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"Emotion has been widely investigated throughout various task-based functional magnetic resonance imaging (fMRI); however, vocal emotional processing and its underlying neural mechanism are less examined. In this study, we assessed the brain network topology using resting-state and task-based fMRI and performed automatic emotion recognition using fusion of audio and fMRI. The vocal emotion stimuli were generated from the USC IEMOCAP database (Busso et al., 2008). The stimuli were rated with 3 levels of arousal (high, middle and low) and valence (positive, neutral, and negative). Two fMRI experiments were conducted: 1) Arousal experiment: includes 3 task conditions of high, middle, low arousal and a resting-state condition 2) Valence experiment: includes 3 task conditions of positive, neutral, and negative valence, and resting-state condition. A total of 18 subjects participated in each experiment. fMRI data was preprocessed using DPARSF toolbox (Yan et al., 2010). We calculated nodal network metrics including degree and PageRank centrality. Functional connectivity (Pearson correlation) between 90 AAL regions were calculated. Further lobe-dependent convolutional neural network and acoustic features were extracted as input to support vector machine. Degree and PageRank centrality showed significant differences between resting-state and each arousal-task conditions in both left and right superior temporal gyri. Significant correlation of degree and PageRank centrality was found between resting-state and valence-task conditions in left amygdala. The resting-state functional connectivity was correlated with all task-evoked functional connectivity. Lastly, multimodal fusion of fMRI and audio information provided significant improvement in recognition accuracies.

Neural Correlates of Semantic Priming of Crowded Words: An Fmri Study

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A target word presented in the peripheral visual field can become unrecognizable due to visual crowding caused by the surrounded flankers, a phenomenon usually occurs in reading. Despite unrecognizable, nevertheless, our previous study showed a robust semantic priming effect from a crowded prime to the subsequently presented target word (Yeh, He, & Cavanagh, 2012, Psychological Science). Here we explore the neural correlates of such semantic priming effect by measuring the BOLD signals with fMRI. Three prime-target relationships were manipulated when both prime and target were Chinese characters: high-related, low-related, unrelated, and a non-word pair was served as perceptual control. Participants judged whether the prime and the target was semantically related if they were words, or whether the prime and the target were identical if they were non-words. The prime was presented at 5° eccentricity on top of the fixation sign, and the target word was either shown alone or crowded by four flankers. Results showed that all word pairs when presented alone and thus recognizable had greater activation in the left inferior frontal gyrus (IFG) and left middle temporal gyrus (MTG), contrast to the non-word pairs. Under visual crowding, however, higher activation of the left IFG was found for either the high-related or low-related word pairs as compared to the non-word pairs. Semantic retrieval process based on the activation of left IFG is thus observed for both crowed and isolated words, while additional representations of verbal semantic information based on MTG activation is obtained only when semantically related words were recognizable. Unrecognizable words under visual crowding may have rendered the semantic representation too weak to be detectable since the sign to semantic retrieval is evident.

The N170 and P3 in Discriminating Faces along the Morphed Continuum of Happy and Fearful Expressions

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The study used morphed faces to investigate the perceptual advantage of between-categorical compared with within-categorical facial expressions.
Twenty-nine participants including 12 males and 12 females (aged from 19-24) were recruited from southern Taiwan. Three sets of male happy and fearful expressions were selected from the natural facial expressions of the Taiwanese standard emotional stimuli database. We then morphed the two kinds of emotions of each set into one hundred equal scaling combined facial expressions. Results found the peak amplitudes (PAs) of N170 of second faces were higher than those of the first faces on PO8. The analysis on Fz, Cz and Pz found that the intensity at Pz were higher than those of Cz and Fz. It was also found that the Same(S) and Within (W) pairs were higher than Between (B) pairs. The mean amplitudes (MAs) of P3 at Pz, Cz, and Fz were also found that Pz were higher than those of Cz and Fz and the second faces higher than the first faces. The Same pairs were higher than the Within pairs, the Between pairs were higher than the Within pairs. These findings suggested that the parietal activation were higher in processing categorical information on faces. The differences among the types of categories across components might suggest different processes that related to emotional perceptual

categorization.

Impact of Putamen Lesions on Task Context Updating: Evidence from P300 Brain Waves

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The oddball P300 wave is widely used to access stroke patients' cognitive functions. According to the context updating theory, the P300 component indexes brain activities underlying revision of the mental representation induced by incoming stimuli. It involves an attention-driven comparison process evaluates the representation of the previous event in working memory. Delayed latencies have been reported for various cerebrovascular diseases, such as the unilateral thalamic stroke. Here, we aim to investigate the memory updating effects in patients with putamen stroke by eliciting auditory and visual P300. Patients with putamen and thalamic stroke were recruited as two patient groups. Young and Age-matched healthy participants were included as two control groups. All patients accepted full clinical examination and MRI scan. Cognitive functions were evaluated for all participants by using the Mini-Mental State Examination (MMSE). Compared to age-matched controls, we found delayed auditory P300 component in both groups of patients with putamen or thalamic stroke. It suggests the impairment of the auditory attention or memory updating in patients with stroke at various location and different lesion type. Our study illustrates the important role of subcortical structures subserved in context updating.

Resource-Based Approach to Music Psychology

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Resource-based approach is the broad interdisciplinary trend in psychology and neuroscience that stresses the necessity of search for resources. The first essay within the resources paradigm devoted specially to psychology of music was proposed by N.Almayev (2000). The lack of resources is experienced as tension while their sufficient level as relieve. Idea that musical experience is the result of tensions and subsequent relieves which stems from Kurth (1947) is consonant with the proposed approach. This way any quantitative change of sound's characteristics may be interpreted in the terms of resources. Proposed theoretical and experimental paradigm was fulfilled in the following studies: 1) Subjective localization of acoustic stimuli in a human body. This study helps to understand, why sound is so mandatory for search of psychic resources during perception. It occurs because every sound is estimated by an organism from the standpoint of its ability to produce this sound. 2) Investigation of tonality, search for the psychophysiological mechanisms of major and minor perception. Major and minor phenomena cannot be understood without the study of sound's attenuation process. Four different types of attenuation is now under investigation: real, midi synthesized, with triangle form of attenuation, with rectangular one. 3) Interaction of tempo and intensity of the stimuli most of all affects the state of a brain. This makes pulsations the key stimuli for psychophysiological study of tension, relief and expectation. Affect of tempo escalation with 70 and 90 dB stimuli were studied with EEG methods. Acceleration of tempo with 90 dB signals leads to selective inhibition of brain activity in the frontal area (F3, FZ, F4), rise of delta and theta rhythms in it. Proposed framework permits to describe in the unified manner changes in subjective perception and psychophysiological data caused by the alterations of stimuli's acoustic characteristics. Supported by RFBR №16-06-00487.

Synesthetic Experience Influence on Determination of Synesthetic Colors in Grapheme–Color Synesthesia

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Grapheme-color synesthesia is a condition in which visual perception of letters induces simultaneous perception of a given color. Grapheme–color correspondences have been shown to be systematically associated with grapheme properties: impacts of visual shape similarity and ordinality (positions in a grapheme sequence) on hue distances of synesthetic colors, and the impact of frequency on luminance distances of synesthetic colors. However, contributions of these factors differ across individuals. The individual differences relate to which grapheme properties the individual is likely to process. Which grapheme properties a synesthete processes may be reflected by the type of subjective experiences the synesthete perceives. Some synesthetes termed "projectors," perceived their associated colors visually in external space." Others, termed "associators," perceived their colors in internal space, characterizing them as existing "in my mind's eye" or "in my head." Differences in processing graphemes for perceiving synesthetic colors between projectors and associators depend on whether connections between graphemes and colors processing are a top–down or bottom–up pathway. Specifically, connections between graphemes and colors in projectors involves the letter shape area in the fusiform gyrus. In contrast, connections between graphemes and colors in associators involves the superior parietal lobe (Van

Leeuwen, den Ouden, & Hagoort, 2011). The present study aimed at obtaining evidence for the following hypotheses: Because shape differences reflect a lower-level perceptual property of graphemes, projectors tend to show strong effects of shape difference on synesthetic colors. In contrast, because ordinality and familiarity reflect conceptual higher-level properties of graphemes, associators tend to show strong effects of ordinality and familiarity on synesthetic colors. We revealed that ordinality and familiarity factors were expressed more strongly among associators than among projectors. This finding suggests that grapheme–color associations are partly determined by the type of synesthetic experience.

Holding Heavy Bags in Hands Improves Mental Rotation Performance in Females but Not in Males

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Mental rotation (MR), a cognitive process of imagining an object rotating, has been considered as an important spatial ability. Previous studies suggest that MR is an embodied process modulated by hand movement. It is also known that males outperform females on MR tests. To better understand the embodied nature and gender differences in MR, the present study examined whether holding heavy bags in hands affected female and male MR performance. In the experiment, 40 right-handed participants (20 females and 20 males) performed a chronometric MR task while standing and holding bags in both hands. Half of the participants (10 females and 10 males) held light bags (0.22 kg × 2) and the other half (10 females and 10 males) held heavy bags (3.22 kg × 2). In each trial, two three-dimensional objects were presented on a display. One object was an identical or mirror-reversed version of the other, being rotated by 0°, 60°, 120°, or 180° in depth. The participants judged whether the two objects were identical or mirror-reversed by pressing a foot pedal. Results showed that females with heavy bags performed MR more accurately and quickly than females with light bags, although male performance was not affected by whether the bags were light or heavy. This gender difference in the heavy-bag effect could not be accounted for by individual differences in body weight. The pattern of the results is similar to a recent finding that concurrent approaching behavior (arm flexion) improves female (but not male) MR performance (Jansen, Kaltner, & Memmert, 2016). The heavy-bag effect could also be explained in terms of approaching behavior because holding heavy bags requires arm muscles to produce pulling forces, which are directed towards one's own body. The present finding has implications for considering the gender difference in embodied processes during MR.

The Psychological and Neural Mechanisms of Semantic Representation: A Comparative Study of GLM and Searchlight Analysis of The Different Responses Between Chinese Fictive Motion and Texture Metaphor Sentences.

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"In the MRI experiment, generally uses the method of GLM analysis In addition to the use of GLM analysis, we tried to join searchlight for data analysis, and compared the results with the results of GLM analysis.
The first set of data for the Fictive Motion：24 participants, Fictive Motion sentence (FMS, it is not real action, but we can imagine that the action, such as the road across the mountains) and Fictive Motion sentence counterpart (FMScp, as control the use of words such as FMS, such as road is between the mountains).
Second sets of data for Texture：25 subjects, mainly Metaphorical sentence (MS, it was originally used to describe real words, abstract words, such as Metaphorical sentence counterpart and tough life) (MScp, as control the use of words such as MS, the difference of the impermanence of life). Analysis of the two sets, using GLM analysis, found that some brain regions in the mission, there are indeed differences; then in the searchlight analysis, FMS and FMScp found in distinguishing or MS and MScp, some brain areas have obvious differences. Finally, the group analysis run T-test, up to 0.05 significant level, meaning that in the task, part of the brain to distinguish FMS and FMScp or MS and MScp has more than 50% accuracy."

The Effect of Training Paradigm in Greeble Expertise Acquisition: A Multi-Voxel Pattern Analysis (MVPA) Approach

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The fusiform face area (FFA) has often been speculated as a brain region that is specialized for face perception and recognition. While it is generally believed that the FFA responds selectively more to facial stimuli than other objects, the expertise hypothesis proposes that the FFA may participate in the processing of any object class that is trained to be processed at the subordinate or individual level. Previous study (e.g., Brands et al., 2011, JOCN xx, pp. xxx-yyy) has shown and interpreted that, the Neuronal Inversion Effect, or higher activity in the upright than in the inverted face condition, observed both before- and

after-expertise training in the FFA, as the evidence that subjects viewed Greebles as faces throughout. Next poster gives the FFA evidence of how two different training regimes (Gauthier et al., 1997, Vision Res., 37(12), pp. 1673-82; vs. Gauthier et al., 1998, ibid., 38/15, pp. 2401-28) yield different FFA responses, and in the current study we explore similar results with MVPA. The multi-voxel pattern analysis is used to distinguish the patterns of FFA activity between Greebles and other stimuli ("Faces" and "Objects"), and we demonstrate that activity patterns of localized FFA perform better at distinction of "Faces vs. Greebles" in before- than after-training does, and in "Greebles vs. Objects" better in after- than before-training does. In both case, the Gauthier 97 paradigm has shown more prominent distinction results than the Gauthier 98 paradigm. In addition, the searchlight information mapping is employed to identify other brain regions that can provide information concerning the neural representation of distinct object classes. Taken together, these results further downplay the conclusion made by Brants et al, (2011), and further strengthen the claim that different training paradigm had profound impact upon the acquired object of expertise representation.

Using MEG to Identify the Neural Correlates of Recollection- and Familiarity-Based Recognition in a Source Memory Task

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Dual-process theories suggested that recognition memory is supported by two qualitatively different processes: recollection and familiarity. Recollection-based recognition is the recovery of contextual information about an encoded event. Familiarity-based recognition is a graded signal that supports judgments of prior occurrence. One of the frequently used method for examining the contributions of recollection- and familiarity-processes to recognition memory is the remember/know procedure. In a typical remember/know procedure, remember response is made when the specific contextual details are recollected; where know response is to be given when contextual information is absent but the item remains familiar. The present MEG study aim to investigate the neural substrates of recognition memory by using the modified remember/know combined with confidence rating procedure. Participants first study words with semantic judgments at encoding phase. During retrieval stage, participants give an old/new confidence rating response followed by a remember/know judgement. The MEG source data reveals distinct temporal and spatial scalp distributions of two processes, where familiarity related activity is observed in the left superior parietal region in the early time window; and recollection related activity is found in the tempoparietal region in the late time window. The current results suggest that recollection and familiarity make dissociable contributions to recognition memory.

Acute Exercise Modulates Amygdala Reactivity to Emotional Processing

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Exercise is known to be beneficial for cognitive and anxiolytic effects. However, the neural mechanism of acute exercise on emotional processing remains to be determined. Here, using a placebo-controlled, within-subject, and crossover design, this fMRI study examined how a single bout of aerobic exercise modulates the amygdala reactivity in response to conscious and nonconscious (backward masked) perception of fearful and happy faces in healthy subjects, who varied in anxiety by the State-Trait Anxiety inventory (STAI-S). Results showed that running and walking sessions did not significantly differ the STAI-S scores. However, the amygdala reactivity exhibited an interaction of emotion by session in the nonconscious, but not conscious, condition. To nonconscious happy relative to fearful processing, amygdala reactivity was reduced after running but was increased after walking. Furthermore, after running relative to walking, the functional connectivity of the amygdala was increased with the orbitofrontal cortex and insula to nonconscious happiness, whereas was decreased with the parahippocampal gyrus and subgenual cingulate to nonconscious fear. The findings demonstrated that a single bout of aerobic exercise could modulate amygdala reactivity and functional connectivity in response to nonconscious, but not conscious, emotional processing. As evidenced by differential amygdala reactivity to perceived happiness and fear, it may shed light on the anxiolytic effect of acute exercise.

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ATTENDEE RESOURCES

Banks

Bank Name	Address	Phone number
CTBC Bank - Gungguan Branch 中國信託 - 公館分行	No.311, Sec. 3, Roosevelt Rd., Da an District, Taipei City 106 臺北市 106 大安區羅斯福路三段 311 號	02-23623377
Taishin Bank - Guting Branch 台新銀行 - 古亭分行	No.28, Sec. 3, Roosevelt Rd., Zhongzheng District, Taipei City 100 台北市中正區羅斯福路三段 28 號	02-23646888
Taipei Fubon Bank - Guting Branch 台北富邦銀行 - 古亭分行	No.100, Sec. 3, Roosevelt Rd., Zhongzheng Dist., Taipei City 100 台北市羅斯福路三段 100 號	02-23650381
Cathay United Bank - Gting Branch 國泰世華 - 古亭分行	106 No.149, Sec. 3, Roosevelt Rd., Taipei City 106 106 台北市大安區羅斯福路三段 149 號	02-23632931
E.sun Bank - Heping Branch 玉山銀行 - 和平分行	No.220, Sec. 2, Nanchang Rd., Jhongjheng Dist, Taipei City 10084 10084 台北市中正區南昌路二段 220 號	02-23641313

Restaurant Guide

Name	Address	Phone Number
The Common	3/F, Section 4, 138 Roosevelt Road, Zhongzheng District 台北市羅斯福路 4 段 138 號 3 樓	09-11901797
Just Italian 義饗食堂	2/F, Just Sleep, No. 83, Sec. 4, Roosevelt Rd, Da'an District 羅斯福路四段 83 號 2 樓捷絲旅台大尊賢館 2 樓	02-7355077
京町 8 号 Kyomachi No.8	No. 8, Bo'ai Road, Boai Special District, Zhongzheng District 台北市博愛路 8 號	02-3812388
Lacuz 新泰食餐廳	2/F, Just Sleep, No. 85, Sec. 4, Roosevelt Rd, Da'an District 羅斯福路四段 85 號 2 樓	02-3661098
Dog01 狗一下居食酒屋	No. 271, Section 3, Tingzhou Road, Zhongzheng District 汀州路三段 271 號	02-3670860
Traditional Taiwanese Snacks 藍家割包	No. 3, Alley 8, Lane 316, Section 3, Luosifu Road, Zhongzheng District 羅斯福路三段 316 巷 8 弄 3 號	02-23682060
Sukiyaki 魯山人和風壽喜燒鍋物	No. 85, Sec. 4, Roosevelt Rd, Da'an District 羅斯福路四段 85 號	02-23630339
Hawker Chan Taiwan 了凡香港油雞飯・麵	1/F, No. 36, Section 1, Zhongxiao West Road 忠孝西路一段 36 號 1 樓	02-23118078
Kidonya 季丼屋	No. 150, Sec. 4, Roosevelt Rd, Da'an District 羅斯福路四段 150 號	02-23680227
Amore Pizzeria 艾茉蕾披薩	No. 140, Sec. 4, Roosevelt Rd, Da'an District 羅斯福路四段 140 號	02-23620808

Program Book

A printed Program book has been provided to each attendee. You can also download an electronic copy of the program book in PDF format from the ICCS website.

ATM

An ATM is located in the Bank of Taiwan. It takes 5 minutes walks from the GIS NTU Convention Center to the Bank of Taiwan.

Audiovisual Equipment for Talks

LCD projectors (e.g., for PowerPoint presentations) will be provided in the talk rooms; however, computers will NOT be provided. Presenters must bring their own laptop computers and set them up BEFORE the start of the session in which they are presenting. We recommend that you test your presentation before your session.

Certificates of Attendance

To receive a Certificate of Attendance, please visit the Registration Desk. If you require any changes, we will be happy to email or mail a copy after the meeting.

Code of Conduct

ICCS is committed to providing a safe and professional environment during our annual meeting. All ICCS members are expected to conduct themselves in a business-like and professional manner. It is unlawful to harass a person or employee because of that person's sex or race. Harassment is prohibited when it creates a hostile or offensive work environment.

Copying and Printing

Copy and printing are not provided by the ICCS. There are several places around the National Taiwan University Campus that will provide printing service. The nearest place is Family Mart near the GIS NTU Convention Center. For poster output, please refer to the ICCS2017 website for a list of print services close to the conference site.

Disclaimer

The Program Committee reserves the right to change the meeting program at any time without notice. Please note that this program was correct at time of printing.

Exhibits

All exhibits are located in the **PLATO** Room of GIS NTU Convention Center.

Lost and Found

The lost and found is located at the ICCS registration desk.

Internet Access

ICCS provides free wireless Internet access in the meeting areas.

Connect to any account start with "**GIS**"; password is **85B1A08C04**.

Food Service/Catering

Coffee, tea, and refreshments will be served during each coffee/tea break timeslot. Your ICCS registration also includes a Welcome Reception. The Welcome Reception is on Friday (September 1) late afternoon, at the Lobby of the GIS NTU Convention Center.

Guests

Guests are allowed complimentary entry into one ICCS session to see the poster session or talk of the person they are guests of. Guests must register at the registration desk upon arrival and be accompanied by an ICCS attendee. Guests must wear their guest badges for entrance into a session, and to attend social functions, including the reception, coffee breaks.

Moderators

Please arrive at the meeting room 30 minutes prior to the start of your session to allow time for setup and to check in with your speakers.

Parking

There is a paid parking lot near the GIS NTU Convention Center called NTU Gongguan paid parking lot ("台大公館收費停車場").

Photographing/Videotaping Presentations

Unless otherwise noted, photographing and videotaping of posters and talks **is permitted** at ICCS. Presenters who **do NOT** wish to be photographed or videotaped should indicate this by displaying the "No videos and photos" image on their poster or on their title slide at the beginning of their talk.

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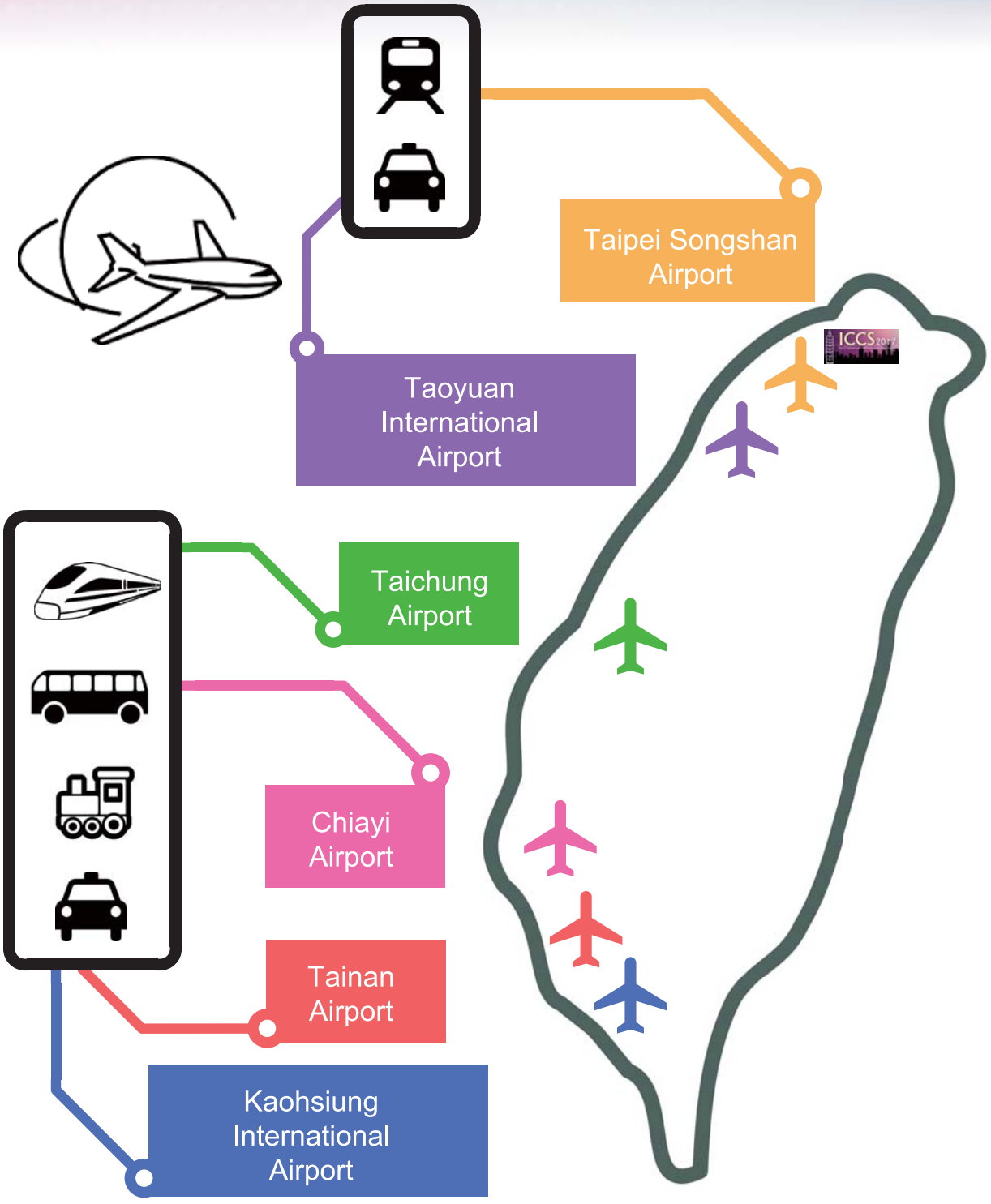

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MRT from the airport to R16 Zuoying Station (Red Line)
HSR from Zuoying Station to Taipei Station

MRT from the airport to R11 Kaohsiung Main Station (Red line)
Bus from Kaohisung Main Station to Taipei Station (Eg. Ubus, Kuo-Kuang...)

MRT from the airport to R11 Kaohsiung Main Station (Red line)
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MRT from Songshan Airport Station to Nanjing Fuxing Station (Wenhu Line)
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Taoyuan International Airport

MRT from the airport to Taipei Station

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(Eg. Ubus, Kuo-Kuang...)

Take bus No. 9 or No. 32 to Taichung Train Station
Train from Taichung Station to Taipei Station

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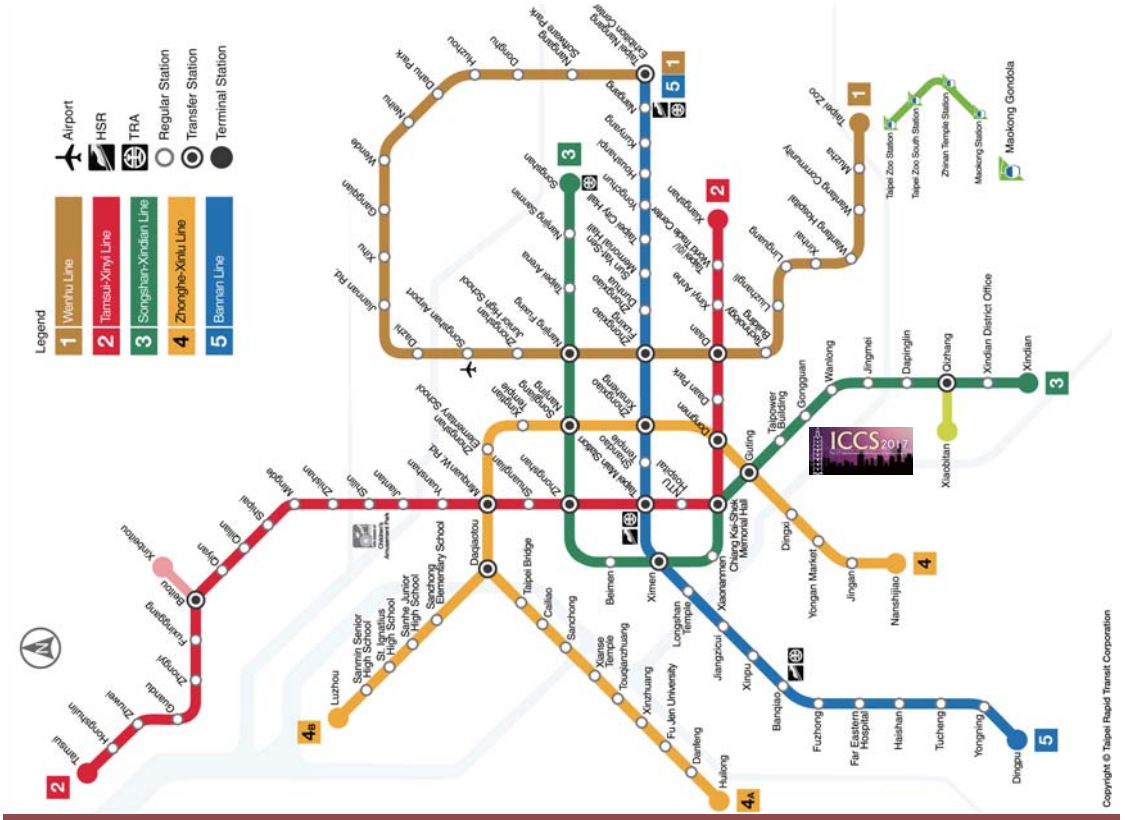
Chiang Kai-Shek Memorial Hall Station to Gongguan Station (Songshan-Xindian Line)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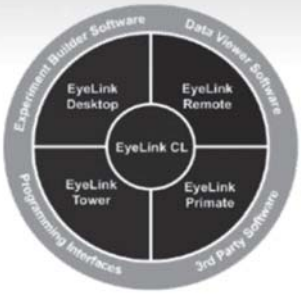

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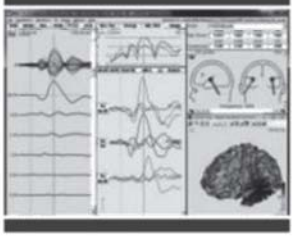
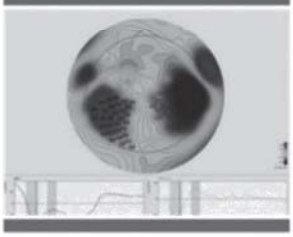


相較於傳統 EEG 分析，這是更容易理解的 EEG/MEG 波源位置信號處理工具

BESA MRI

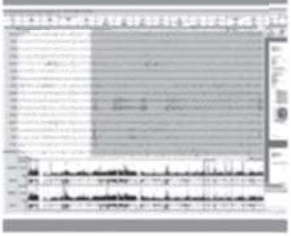
可建立區辨性的四層 FEM 模型，使得容易改善各解剖面的波源分析

BESA Statistics



可執行 ERP、波源、影像及一致性結果的跨種族排列統計分析

BESA Epilepsy



CE 認證的臨床軟體，可作為有效的 EEG 流覽及癲癇脈衝的自動偵測

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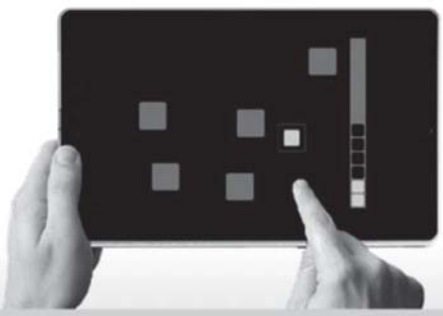

相關影片

MINDMEDIA
NEURO AND BIOFEEDBACK SYSTEMS

NeXus 10 藍芽無線 生理訊號/回饋系統

- 更好的訊號：主動去除雜訊功能
- 新穎的感測器及連接頭：可信度更高
- 新一代的連線方式：無線傳輸技術
- 超大波段的放大器：具有經濟效益
- 較佳的解析度：24-bit
- 數位式感測器：更好的介面、更多的頻道
- 易操作的軟體可彈性設計自己的介面
- 可提供 API 程式碼

相關影片

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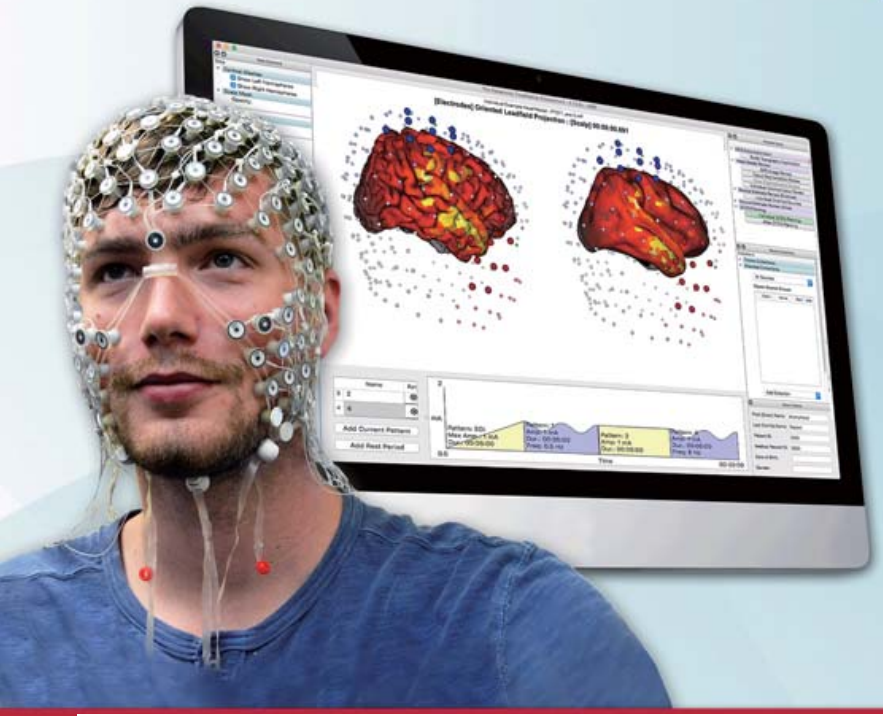

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