

## In the mood for risk? an experiment on moods and risk preferences

***Citation for published version (APA):***

Michl, T., Koellinger, P. D., & Picot, A. (2011). In the mood for risk? an experiment on moods and risk preferences. In *Proceedings of the NeuroPsychoEconomics Conference, 26-27 May 2011, Munich, Germany* (pp. -28)

***Document status and date:***

Published: 01/01/2011

***Document Version:***

Accepted manuscript including changes made at the peer-review stage

***Please check the document version of this publication:***

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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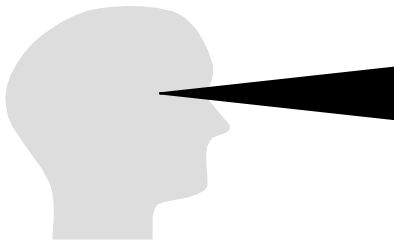
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<http://www.neuropsychoeconomics.org>  
ISSN 1861-8243

# 2011 NeuroPsychoEconomics Conference Proceedings



# Imprint

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# 2011 NeuroPsychoEconomics Conference Program

**Conference Theme: “Excellence in Neuroeconomics –  
Striving for Impact in Economics, Management, and Marketing Research”**

**TECHNISCHE UNIVERSITÄT MÜNCHEN, TUM SCHOOL OF MANAGEMENT**  
(Arcisstrasse 21, Munich, Germany)

## **May 26, 2011**

- 04:00-05:30 PM: Annual Meeting of the Editorial Board of the  
*Journal of Neuroscience, Psychology, and Economics*  
(Editorial Board Members Only)  
Location: Vorhoelzer Forum (Room 5170)
- 06:00-07:00 PM: Registration  
Location: Foyer of Vorhoelzer Forum (Room 5170)
- 06:00-07:00 PM: Reception  
Location: Foyer of Vorhoelzer Forum (Room 5170)
- 07:00-10:00 PM: Munich Nightlife  
Meeting point: Foyer of Vorhoelzer Forum (Room 5170)  
Location: Weisses Bräuhaus (Tal 7, 80331 Munich)  
(paid on your own)

## **May 27, 2011**

- 08:00 AM: Registration  
Location: Foyer of Vorhoelzer Forum (Room 5170)
- 09:00 AM: Welcome note by the Conference Chair  
Isabell Welpé, Technische Universität München  
Location: Vorhoelzer Forum (Room 5170)
- 09:30 AM: Key note speech:  
Elke Weber, Columbia University  
Query theory: Understanding preference construction to facilitate effective  
policy and decisions  
Location: Vorhoelzer Forum (Room 5170)
- 10:30 AM: Coffee break  
Location: Foyer of Vorhoelzer Forum (Room 5170)

- 11:00 AM: **Session I**
- Track:** Consumer Behavior & Neuromarketing  
**Track chair:** Arnd Florack, University of Vienna  
**Location:** Vorhoelzer Forum (Room 5170)
- 11:00 AM: *The uses of argument 2.0: neural mechanisms underlying trustworthy argumentation in online shopping*  
Linzmajer, Hubert, Riedl, Kenning
- 11:20 AM: *Regional brain activation with advertising images: initial findings with source localization*  
Cook, Warren, Pajot, Schairer, Leuchter
- 11:40 AM: *The 2008 crisis from the neurofinance perspective: the case of Bovespa*  
Rocha, Da Rocha Lima Filho, Augustus, Lima
- 12:00 AM: *Virtual customer journey evokes brain's buying circuits*  
Palokangas, Numminen, Heinonen, Suomala
- 12:20 AM: *Making personalized health care more precise: implications of neuroscientific findings*  
Sohn
- Track:** Organizational Behavior & Organizational Decision Neuroscience  
**Track chair:** Bodo Vogt, Otto von Guericke University of Magdeburg  
**Location:** Presentation Room I (Room 4168)
- 11:00 AM: *Cause you're hot and you're cold: what distinguishes social entrepreneurs from business entrepreneurs?*  
Baierl, Grichnik
- 11:20 AM: *Distrust, stereotyping, loss of control? Selection biases in information processing in the relationship between private equity investors and the family firm*  
Poech, Groth
- 11:40 AM: *Cognitive style and the specification of entrepreneurial intentions models*  
Krueger, Kickul
- 12:00 PM: *Tables and graphs in management accounting reports*  
Hirsch, Bassler
- 12:20 PM: *A neuroexperimental design on the influence of experienced gains and losses on risk-taking behavior*  
Michl
- 01:00 PM: Lunch  
(included in conference fee)  
Location: Foyer of Vorhoelzer Forum (Room 5170)
- 02:00 PM: Award speech and best paper award ceremony  
Isabell Welp, Technische Universität München  
Location: Vorhoelzer Forum (Room 5170)
- 03:00 PM: Coffee break  
Location: Foyer of Vorhoelzer Forum (Room 5170)

03:30 PM:

**Session II**

**Track:** Behavioral Economics & Neuroeconomics  
**Track chair:** Bernd Weber, University of Bonn  
**Location:** Presentation Room II (Room 4905)

03:30 PM:

*Determining risk preferences for pain*  
Kroll, Trarbach, Vogt

03:50 PM:

*Food for thought? Trust your unconscious when energy is low*  
Bos, van Baaren, Dijksterhuis

04:10 PM:

*Measuring regret: emotional aspects of auctions*  
Astor, Adam, Jaehrig, Seifert

04:30 PM:

*In the mood for risk? An experiment on moods and risk preferences*  
Michl, Koellinger, Picot

04:50 PM:

*Gender differences in willingness to pay for pain and their correlation with risk*  
Pesheva, Vogt, Kroll

**Track:** Consumer Behavior & Neuromarketing  
**Track chair:** Ale Smidts, Erasmus University Rotterdam  
**Location:** Vorhoelzer Forum (Room 5170)

03:30 PM:

*Neural correlates of searching*  
Rumpel, Reimann, Sadrieh, Bechara

03:50 PM:

*The social consciousness of consumers: theory, scale development and validation*  
Balderjahn, Peyer

04:10 PM:

*Digital signage for in-store advertising at gas stations/retail stores in Germany: a field study*  
Kruse, Fischer, Spörrle

04:30 PM:

*Distributed cognition and consumer choice: integrating neuroeconomics and semiotics in consumer research*  
Herrmann-Pillath

04:50 PM:

*Developing best practices in neuromarketing research: the "NeuroStandards Collaboration" project of the Advertising Research Foundation*  
Stipp, Weber, Varan

**Track:** Organizational Behavior & Organizational Decision Neuroscience  
**Track chair:** Frauke Lammers, University of Bern  
**Location:** Presentation Room I (Room 4168)

03:30 PM:

*Why are entrepreneurs more risk loving? On the reference dependencies of entrepreneurial decision making*  
Hack, Lammers

03:50 PM:

*Intrinsic motivational drivers in medical networks from a neuroscientific perspective*  
Sohn, Ottmann, Schöffski

04:10 PM:

*Neuro change: enhancing traditional change management approaches through neuroscientific based concepts*  
Kupiek



- 04:30 PM: *Does marriage and having children crowd out employees' intrinsic motivation?*  
Georgellis, Lange, Tabvuma
- 04:50 PM: *Applying versus buying: neural correlates of first choice employer brands and similarities and differences to first choice consumer brands*  
Rampl, Opitz, Welpel, Kenning
- 05:30 PM: Good bye note from the Conference Chair  
Isabell Welpel, Technische Universität München  
Location: Vorhoelzer Forum (Room 5170)
- 05:45 PM: End

## 2011 NeuroPsychoEconomics Poster Sessions

Poster sessions will take place from 10:30 AM to 11:00 AM and from 03:00 PM to 03:30 PM at the Foyer of Vorhoelzer Forum.

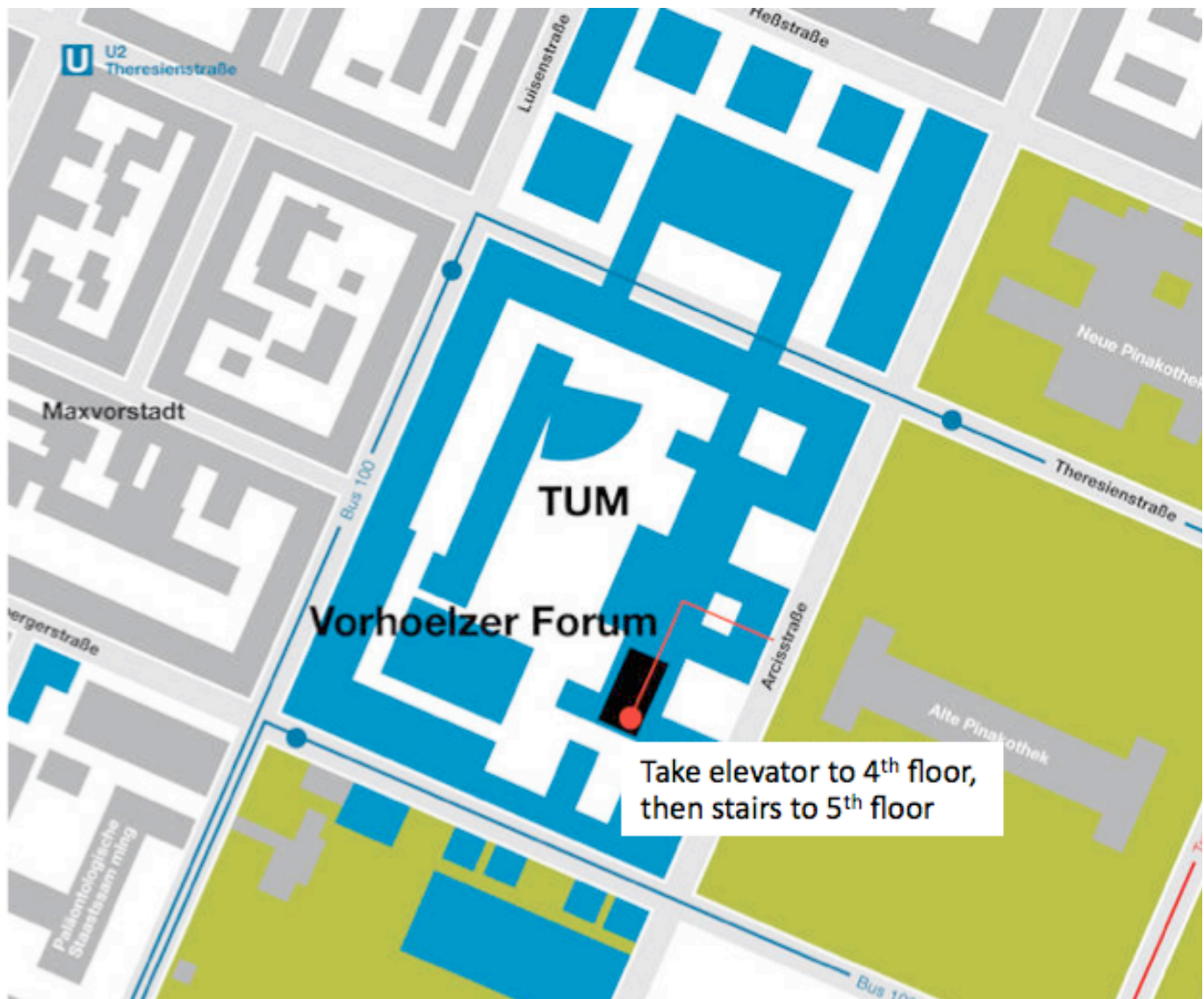
Poster session participants must display their poster by 9:00 AM on May 27, 2011 at designated spaces at the conference venue.

- P1** *Reevaluating the “prominent deck B phenomenon” in the revised gamble with compounded version of IGT and inverse IGT*  
Chiu, Lin, Song, Yen, Lin
- P2** *Reexamining effect on risk behavior of prior gain-loss in a dynamic gambling task*  
Lin, Tsai, Song, Lin, Chiu
- P3** *Foresighted or myopic choice behavior in Iowa gambling task: evidence from securities traders*  
Song, Lin, Shen, Chiu
- P4** *Intuitive decisions: the influence of phonetic and letter frequency recognition heuristics on brand selection decisions*  
Rubenwolf, Spörrle
- P5** *Knowledge nudges you into nibbling nature: obesity risk knowledge as a sensitizer for ecological food choice*  
Haller, Spörrle
- P6** *The direct and indirect effects of the attractiveness-gender bias on social interaction and hiring intentions in an employee selection scenario: the moderating influence of social comparison orientation*  
Nachtigall, Agthe, Spörrle
- P7** *Yes, the brand is green, but why should it matter? Extending the process model of green brand equity to consumer attitudes and word-of-mouth*  
Hedjasie, Bekk, Spörrle
- P8** *Mother earth is calling! Gender dimensions of brand personality as incrementally predictive indicators of green brand image and the moderating influence of green value orientation*  
Hohenberger, Bekk, Spörrle
- P9** *Representativeness and conservatism in Bayesian updating: investigating rational and boundedly rational decision making by means of error rates, response times, and event-related potentials*  
Hügelschäfer, Achtziger, Alós-Ferrer, Steinhauser
- P10** *Eye-tracking: status quo and future directions beyond mainstream applications*  
Koller, Salzberger, Brenner
- P11** *Neuroentrepreneurship: what can entrepreneurship educators (& practitioners?) learn from neuroscience?*  
Krueger
- P12** *Why do people cooperate? The role of behavior-associated genes in individual decision-making*  
Mertins, Schote, Hoffeld, Griessmair, Meyer
- P13** *The influence of affect induction in the ultimatum game on decision-making and feedback-related negativity*  
Mussel, Hewig, Allen, Coles, Miltner

- P14** *Sex sells? How gender moderates the effects of arousing advertising stimuli on purchase intention and willingness to pay*  
Nenninger, Behn, Benz, Leder, Linzmajer, Hubert
- P15** *Integrative ethics management systems in family firms: an exploratory approach*  
Poech, Kriwanek
- P16** *Emotional experiences as drivers of successful employer branding? Testing the somatic marker hypothesis with fMRI*  
Rampl, Opitz, Welppe, Kenning
- P17** *The role of oxytocin in social norm enforcement*  
Stallen, Smidts, de Dreu, Sanfey
- P18** *The neural basis of relational models: applications in management research*  
Strobel, Tumasjan, Welppe
- P19** *Functional neuroimaging of media brand attractiveness*  
Sztrokay, Gutyrchik, Reiser, Fehse, Poeppel, Meindl
- P20** *Prior and likelihood uncertainty are differentially represented in the human brain*  
Vilares, Howard, Fernandes, Gottfried, Kording

# Map of TECHNISCHE UNIVERSITÄT MÜNCHEN

(Arcisstrasse 21, Munich, Germany)





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## The uses of argument 2.0:

### neural mechanisms underlying trustworthy argumentation in online shopping

Marc Linzmajer<sup>1</sup>, Marco Hubert, René Riedl, Peter Kenning

---

#### Abstract

In a world of increasing complexity and uncertainty the question how consumers learn to trust is at the heart of marketing research. Recently, cognitive neuroscience theories and methods have been suggested to be used in marketing research, because they are expected to facilitate scientific progress in the field. This expectation is primarily driven by the idea that learning more about the brains of consumers will add a new theoretical perspective to marketing research. This new neurobiological perspective might help to better explain consumer behavior. Against this background, the objective of our study was (i) to use a certain neuroimaging technique, namely functional magnetic resonance imaging, to investigate the brain regions associated with trustworthiness judgments, and (ii) to identify the neural mechanisms underlying Toulmin's theory of argumentation, a theory that can be applied to build trust through structured communication. Our study shows that the neural mechanisms underlying Toulmin's theory of argumentation correspond to the brain regions associated with trustworthiness judgments. Therefore, our study has both theoretical and practical implications. In particular, it demonstrates that the effects of marketing communication (e.g., in advertising) based on Toulmin's theory of argumentation on consumer behavior is mediated by activation in trust-related brain areas.

---

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---

# Regional brain activation with advertising images: initial findings with source localization

Ian A. Cook<sup>2</sup>, Clay Warren<sup>2</sup>, Sarah K. Pajot, David Schairer, Andrew Leuchter

---

## Abstract

Preferences for purchasing goods and services may be shaped by many factors, including advertisements presenting logical, persuasive information or those employing images or text that may modify behavior without requiring conscious recognition of a message. The hypothesis that these two types of messages (“logical persuasion” [LP] vs “non-rational influence” [NI]) might affect brain function differently was tested in a pilot project, using stimuli drawn from real-world print advertisements and quantitative EEG as a noninvasive measure of regional brain activity. Twenty-four healthy subjects, 11 women and 13 men, viewed images while brain electrical activity was recorded. The LORETA method was used to quantify current intensity in brain regions implicated in decision-making and emotional processing. Data were analyzed using a block design to compare brain activity during LP and NI stimuli periods. LP stimuli were associated with significantly higher activity levels in orbitofrontal, anterior cingulate, amygdala, and hippocampus regions than NI images. These findings suggest that advertising images can evoke different levels in regional brain activity, related to the use of LP and NI elements.

---

<sup>2</sup> Corresponding authors: Ian A. Cook, University of California, Los Angeles, E-Mail: [ICook@mednet.ucla.edu](mailto:ICook@mednet.ucla.edu); and Clay Warren, The George Washington University, Washington, DC, E-Mail: [claywar@gwu.edu](mailto:claywar@gwu.edu).

---

# The 2008 crisis from the neurofinance perspective: the case of Bovespa

Armando F. Rocha<sup>3</sup>, Roberto Ivo Da Rocha Lima Filho, Heitor Augustus,  
Igor Ribeiro Lima

---

## Abstract

The world is still facing a financial crisis, which started in mid 2007 and up to now is far from being solved. Stock markets around the world reacted badly and the real time news has never played such an important role to investors as seen in previous crisis. In other words, the impact of the media deepened the bear dynamics of the markets, that is, it amplified the volatility of it. Neuroeconomics is a new field of inquiring that has the purpose of studying decision making taking into consideration the role played by emotion. Here, we use these notions to develop a neuroeconomic modelling of the Brazilian stock market that assumes that the investor's humor is dependent on the market sentiment, which in turn is sensitive to the kind of news delivered by the media. We used this model to study the Bovespa index (IBOV) evolution from January, 2003 to September, 2010 and correlated the market sentiment to an index of Good/Bad news about IBOV. The outcome shows that market sentiment depends of the news direction, that is, good and bad news, and directly influences stock market indices.

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<sup>3</sup> Corresponding author: Armando F. Rocha, University of Sao Paulo, E-Mail: roberto\_ivo@hotmail.com.

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# Virtual customer journey evokes brain's buying circuits

L. Palokangas, K. Numminen, J. Heinonen, Jyrki S. Suomala<sup>4</sup>

---

## Abstract

The studies in the neuromarket include rich insights to consumer behaviour when understanding the neural activity during the purchase. However, there is little number of research that study consumer behaviour during personal selling. In a realistic consumer retail sales situation a consumer often has made an upfront decision to purchase, but he or she would need help to identify the most suitable solution for his/her problem. This study created a research setting where consumer neurophysiological activity was analysed by fMRI scans as a consumer was exposed to the retail marketing assets. The assets were organized to support consultative selling process. In the consultative selling process both the seller and the buyer has an intention to close the sales. The results indicate that from the moment of a problem solving, a physiological response can be observed in the Inferior Frontal Gyrus. The results suggest that even if the elevated degree of Willingness To Purchase did not remain in the behavioural test results until the latter phases of the consultative selling process, the physiological results indicated plateau of the BOLD signal until the end of the marketing exchange. In addition, the study demonstrated how retail marketing can benefit from fMRI method.

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---

# Making personalized health care more precise: implications of neuroscientific findings

Stefan Sohn<sup>5</sup>

---

## Abstract

The individualization of health care occurs when knowledge of what is best for a specific patient is used in a specific treatment situation. Currently the treatment of a patient is dependent on a set of primarily medical parameters that help to individualize the chosen therapy. In the future, supplementary parameters will be needed to enhance therapy success. One possible parameter would be the use of information about the personality of the patient. This article will first review given findings about the relation between personality and health. Subsequently the implications of these findings will be explored and a research proposal will be presented. A literature review was conducted, including articles that discuss the relationship between personality and health in a theoretical or empirical manner. The analysis focused on studies using the NEO-FFI or the TCI in combination with a psychological or somatic illness. Studies of personality measures show a variety of relationships between personality traits and morbidity, even for somatic illnesses. In addition to the existing parameters used to determine therapy, personality data could help determine a more precise etiology, diagnosis and therapy for the individual patient. Also new possibilities are created for a more compatible form of doctor-patient relationship, as well as a more structural approach to strengthen the patient orientation of the physician. Implementing this approach will require extensive discourse about the implied ethical aspects.

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## Cause you're hot and you're cold:

### what distinguishes social entrepreneurs from business entrepreneurs?

Ronny Baierl<sup>6</sup>, Dietmar Grichnik

---

#### Abstract

To fully understand an individual's intention to become either a social entrepreneur or a business entrepreneur within the pre-entrepreneurial decision process, it is necessary to look at external and individual factors. Therefore, we investigate the influence of cold cognitions in terms of economic success and social impact as external and experimentally manipulated factors. Moreover, we include positive and negative affective states to cover the field of hot cognitions. In consequence, we show profound differences between social entrepreneurs and business entrepreneurs when articulating their entrepreneurial intention to exploit an envisioned opportunity.

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## **Distrust, stereotyping, loss of control?**

### **Selection biases in information processing in the relationship between private equity investors and the family firm**

Angela Poech<sup>7</sup>, Thorsten Groth

---

#### **Abstract**

Small and medium enterprises frequently associate private equity with deterrent buzzwords as loss of control and influence, admittance of voice and accountability, and high yield compression. This may arouse problems as selection biases in information processing are followed by selection biases in decision making – insofar as a potentially reasonable form of financing will be no object of further considerations. The goal of the study was to question a heterogeneous group of small and medium enterprises in relation to their information level, information behaviour and attitudes with regard to private equity. Statements of the 266 surveyed companies, 85% of them family businesses (with 100% of their stakes in the hands of the family), show that what deters the majority of companies from private equity financing are high return expectations on the investor's side and the fear of losing decision power over one's own business. Comparisons of the surveyed firms, amongst others between private-equity-backed and non-private-equity-backed companies, provide some evidence on selection biases in information processing concerning private equity financing.

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# Cognitive style and the specification of entrepreneurial intentions models

Norris F. Krueger<sup>8</sup>, Jill Kickul

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## Abstract

Intentions are central to entrepreneurial thinking and thus entrepreneurial action. We understand the critical antecedents of intentions, yet we have not yet explored the pathways by which entrepreneurs arrive at this intent. The very robustness of the dominant models to even seemingly egregious misspecification has been a blessing yet it seems likely that we are still missing an important part of the picture. Entrepreneurial cognition research has only begun to explore the role of cognitive style which would seem capable of playing a major role in entrepreneurial thinking. In specific, how does a relatively stable measure cognitive style influence nascent entrepreneurs' development of their perceptions of intentionality? This is not just differences in intentions but differences in the model itself. Here we examine the complex interaction of cognitive style with entrepreneurial intentions, controlling for social norms, location and gender, finding evidence that there are indeed multiple pathways to an entrepreneurial intent. In particular, we found that cognitive style has a dramatic effect on the specification of the formal intentions model, the first evidence that the formal intentions model need not be universal. That is, we can argue vigorously that entrepreneurs' intentions can evolve along different pathways: Two entrepreneurs might arrive at the same intention but through very different processes, possibly only because they differ on cognitive style. Given these findings, we discuss practical implications for entrepreneurship pedagogy and training and explore directions for future research.

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# Tables and graphs in management accounting reports

Bernhard Hirsch<sup>9</sup>, Anna Bassler

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## Abstract

Managers are confronted with increasing information overload and growing pressure on effective and efficient decision making. The visualization of data represents a way to overcome this dilemma and improve management decision quality. In this paper we clarify the impact of visualizations in management accounting reports on decision making. Our research contributes to behavioral management accounting research by investigating parameters for successful visualization of data in management accounting reports. We conducted an experimental study to increase awareness on how information from reports is processed by managers. Supplementary graphs in management accounting reports have significantly increased decision quality but not affected decision speed or decision confidence in a performance evaluation task.

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# A neuroexperimental design on the influence of experienced gains and losses on risk-taking behavior

Theresa Michl<sup>10</sup>

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## Abstract

Some economic studies show that risk-taking behavior is influenced by prior monetary gains and losses. Two phenomena are observed in the literature: The house-money effect and the break-even effect. The first effect is that people become more risk-seeking after a gain. The second effect is that people become more risk-seeking after a loss if they have a chance to recoup this loss and break even. Neuroeconomics can help investigate such dynamic risk-taking behavior, providing important insights that are often missing in the economic literature. In this paper, we propose a neuroexperimental design to simultaneously test both effects, providing useful implications regarding dynamic risk-taking behavior and filling the gaps in the economic literature with neural evidence.

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# Determining risk preferences for pain

Eike B. Kroll, Judith N. Trarbach<sup>11</sup>, Bodo Vogt

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## Abstract

The QALY concept is the commonly used approach in research to evaluate the efficiency of therapies in cost utility analysis. We investigate the risk neutrality assumption for time of the QALY concept: can time be included as a linear factor? Various studies show that this assumption does not hold empirically. However, the results are based on hypothetical questionnaires rather than decisions with real consequences. Experimental economists argue that experiments are necessary to avoid hypothetical bias. Our study provides the first experimental analysis of health related decision making. Using the cold pressor test we can analyze decisions when subjects face real consequences. Analog to the hypothetical studies, our experimental results of real decisions provide no linear time preferences. In conclusion, the QALY concept needs to be modified by a weighting factor for time.

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## Food for thought?

### Trust your unconscious when energy is low

Maarten W. Bos<sup>12</sup>, Rick B. van Baaren, Ap Dijksterhuis

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#### Abstract

Executive functioning depends on energy provided by glucose, and conscious performance deteriorates when energy is low. Unconscious processes require less energy and may operate unhampered when energy is low. The current research indeed shows that, when making decisions, the unconscious can best be trusted when energy is low, whereas conscious deliberation yields the best results when energy is high.

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# Measuring regret: emotional aspects of auctions

Philipp J. Astor<sup>13</sup>, Marc T. P. Adam, Caroline Jähnig, Stefan Seifert

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## Abstract

Recent research strengthens the conjecture that human decision-making stems from a complex interaction of rational judgment and emotional processes. A prominent example of the impact of emotions in economic decision-making is the effect of regret-related information feedback on bidding behaviour in first-price sealed-bid auctions. Revealing the information “missed opportunity to win” upon losing an auction, results in higher bids. Revealing the information “money left on the table” upon winning an auction, results in lower bids. The common explanation for this pattern is winner and loser regret. However, this explanation is still hypothetical and little is known about the actual emotional processes that underlie this phenomenon. This paper investigates actual emotional processes in auctions with varying feedback information. Thereby, we provide an approach that combines an auction experiment with psycho-physiological measures which indicate emotional involvement. Our economic results are in line with those of previous studies. Moreover, we can show that loser regret results in a stronger emotional response than winner regret. Remarkably, loser regret is strong for high values of “missed opportunity.” However, the pattern for different amounts of “money left on the table” is diametric to what winner regret theory predicts.

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# In the mood for risk?

## An experiment on moods and risk preferences

Theresa Michl<sup>14</sup>, Philipp D. Koellinger, Arnold Picot

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### Abstract

This study investigates moods' influence on risk preferences. We conducted a large-scale economic experiment (N = 322) on risk preferences that manipulates individuals' moods, inducing either joy, fear or sadness. In contrast to psychological studies on this topic, our experiment uses an incentive-compatible measure of risk preferences (Holt and Laury 2002) that we apply separately to the win and loss domain. Additionally, we differentiate between no, low, and very high financial stakes. Our results suggest that only some individuals are affected by their mood and that the magnitude of the financial stakes influences if and how moods impact risk preferences. In particular, we find no consistent evidence that moods influence risk preferences when individuals' choices do not have financial consequences. With low financial stakes, we find that joy leads to risk-seeking, whereas fear and sadness lead to more risk aversion than a neutral mood does. With very high financial stakes, positive and negative moods induce more risk-seeking than a neutral mood does. If moods have an effect, the direction in the win and in the loss domains is similar. Finally, in our experiment, individuals affected by their moods tend to perform financially worse than individuals not affected by their moods.

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# Gender differences in willingness to pay for pain and their correlation with risk

Daniela K. Pesheva<sup>15</sup>, Bodo Vogt, Eike B. Kroll

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## Abstract

This paper presents experimental evidence on forced choices between inferior alternatives. In asking subjects to make tradeoffs between an experimentally induced cold-pressor pain of different durations and paying money to avoid the administration of pain, we try to shed some light on the questions: 1) are there any gender differences in elicited WTP values for pain; 2) when present, is differing WTP across genders better explained by measures of risk-aversion or measures of loss-aversion; 3) we further investigate whether there are variations in hypothetically elicited WTP values (hypothetical pain and hypothetical money) and WTP values elicited when subjects face real consequences (both real pain and real money). Our results confirmed the hypothesis of significant gender differences in elicited WTP values in both the hypothetical and real groups. We also found some evidence of significant differences due to the treatment. Subjects who experienced the cold-pressor pain only once (hypothetical group) exhibited on average greater WTP compared with subjects who experienced the cold-pressor pain multiple times (real group). Females, however, stated lower WTP in the real treatment while for males the effect was in the opposite direction. Moreover, we found risk attitudes to be significantly associated with WTP while loss-aversion not.

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# Neural correlates of searching

Franziska Rumpel<sup>16</sup>, Martin Reimann, Abdolkarim Sadrieh, Antoine Bechara

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## Abstract

Despite recent neuroscientific research on how the brain integrates the stream of information humans face constantly, much of the neural properties of information search remain unclear. In the present study, participants were confronted with pictures and texts as information cues that differed in the level of affect and rationality, while engaging in a novel search task and undergoing fMRI. We found that while information presented as emotional and rational assessed picture cues correlate with amygdala, caudate nucleus, and hippocampus. Information presented as emotional and rational assessed texts leads to increased activation in higher-order temporal areas and the precuneus. When differentiating between the level of affect and rationality of the information cues, emotional picture cues engage the medial prefrontal cortex, whereas emotional text cues involve the insular cortex, amygdala, and parts of the prefrontal cortex. On the contrary, comparing emotional and rational cues in general, rational (pictures and texts) cues involve the cuneus, cingulum, and medial parts of the prefrontal cortex, and emotional cues (pictures and texts) involve the cingulum. Our findings imply that when searching and being confronted with different information cues varied in presentation mode and level of affect and rationality, individuals choose different informational aspects as being relevant for their search outcome.

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# The social consciousness of consumers: theory, scale development and validation

Ingo Balderjahn, Mathias Peyer<sup>17</sup>

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## Abstract

This paper presents the details of the development and validation process of a scale to measure the social consciousness of consumer (ConSR; consumer social responsibility). As a result of our international research we ascertained that no appropriate scale exists to measure the social consciousness. Many measurement concepts scramble ecological and social features although in the sustainable discussion these represent different parts. In our paper we define and operationalize the dimensions behind the social consciousness. On the one hand we measure the beliefs about the international labor standards for staff members of a company and their suppliers in a purchase situation for a specific product. On the other hand we operationalize the dimension concern. The concern of how importance it is to sanction companies by a purchase decision in a positive or negative way. These two scales were found to be reliable. Also construct validity was demonstrated. The scale passed a first and necessary test but should apply in further research for social consciousness consumer.

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# Digital signage for in-store advertising at gas stations/retail stores in Germany: a field study

Joachim Kruse,<sup>18</sup> Peter Fischer, Matthias Spörrle

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## Abstract

Digital Signage networks provide a novel means of advertising with the advantage of easily changeable and highly customizable animated content. Despite the potential and increasing use of these media empirical research is scarce. In a field study at 8 gas stations (with integrated convenience stores) we studied the effect of digital signage advertising on sales for different products and services over a 3-month test period compared with the equivalent months a year before as control period as well as the months directly before the test period. We were able to show increases in sales for a select range of products, and for product categories (i.e. hot beverages), interpretable as an halo effect. For car wash services not the actual number of cars washed increased but the number of high quality services chosen. These (more expensive) “upgrades” were advertised and consequently chosen more often. Car wash services were highly dependent on weather, time of year and day of week and hardly susceptible to advertising. However, the number of “high quality” car wash services increased. In summary, digital signage proves to be an effective advertising instrument with potential for 10-20 % sales increase, but only for select products and product categories.

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# Distributed cognition and consumer choice: integrating neuroeconomics and semiotics in consumer research

Carsten Herrmann-Pillath<sup>19</sup>

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## Abstract

Consumer research is a cross-disciplinary field where recently neuroscientific methods are becoming more prominent, following the rise of neuroeconomics in economics. The paper argues that the proper placement of neuroeconomics in the spectrum of research methods in consumer research requires to adopt a distributed cognition framework. This is outlined by relating semiotics with a dual-selves model of human agency which reflects the neuroscientific distinction between different modules in the brain, especially decision modules and evaluative modules. I apply this framework on the analysis of consumption disorders, which I explain as resulting from interactions between sign processes and physiological processes.

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## Developing best practices in neuromarketing research:

### the “NeuroStandards Collaboration” project of the Advertising Research Foundation

Horst Stipp<sup>20</sup>, René Weber, Duane Varan

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#### Abstract

In the past few years, a wide range of biometric and neuro-scientific methods are increasingly finding application in media, marketing, and advertising research. Many advertisers and media providers are clearly excited by the prospect of finding new methods that promise a better understanding of the emotional drivers of their content through methods that transcend verbally-dependent or other “traditional” response data. On the other hand, given the complexity of the science underlying these methods it is difficult for marketers to decide which approach is best for their objectives. Moreover, despite the promise of these new methods, there are still a number of questions associated with their application to different kinds of research objectives. The ARF project addresses these issues and suggests a number of solutions

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# Why are entrepreneurs more risk loving?

## On the reference dependencies of entrepreneurial decision making

Andreas Hack, Frauke Lammers<sup>21</sup>

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### Abstract

Empirical evidence on the risk propensity of entrepreneurs has produced inconclusive results. One reason might be that most studies consider risk propensity as a stable personality trait, thereby covering only one of the research streams on risk-taking behavior. In this article, we consider the situational factors of risk propensity as described by prospect theory. We show that entrepreneurs set significantly higher reference points than do nonentrepreneurs. For a given distribution of outcomes, this behavior can explain a subsequent willingness to take on more risks. Furthermore, we find that need for achievement has a direct and a mediating effect on the formation of the reference point. In contrast, we do not find a significant effect of optimism.

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# Intrinsic motivational drivers in medical networks from a neuroscientific perspective

Stefan Sohn<sup>22</sup>, Sabine Ottmann, Oliver Schöffski

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## Abstract

The relationship between motivation, performance, and incentives in the context of health care delivery is of high interest for the rising number of networks and other provider groups under pay-for-performance programs. Because recent literature suggests a high influence of intrinsic motivation, the study analyses the intrinsic motivational factors that drive physicians' behavior and performance by investigating motivational dimensions derived from neuroscientific approaches. The aim was to test for the existence of different motivational groups in a sample of 117 German network physicians. The motivational groups were determined by the individuals' combination of three neuroscientifically-based personality traits. The cluster analysis identified four distinct clusters in the sample and stated the assumption that different motivational clusters of physicians exist. Related to the clusters there were also clearly differing attitudes towards different forms of incentives. These results help to find more appropriate incentives, e. g. in pay-for-performance schemes, to motivate network physicians and enhance their performance and effectiveness and partially explain the weak evidence of recent pay-for-performance evaluations.

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## Neuro change:

# enhancing traditional change management approaches through neuroscientific based concepts

Martin Kupiek<sup>23</sup>

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### Abstract

It is indicated that the success rate of change management projects varies between 30 to 40%. Even though any change project requires substantial investments in terms of money, time, and effort many undertakings fail. This paper investigates the potential contributions of current neuroscientific research results aimed at increasing the success rate of change management projects. An underlying change management framework based on systems theory and cognitive social psychology serves as reference for discussing selected findings of pertinent neuroscience research findings that will be presented and examined. The results indicate that there are some promising innovative approaches. A different perspective on a micro level, i.e. the individual and the team as well on the macro level, i.e. the organization provides first insight into how organizational change can be improved. I will show on the basis of a neuroscientific concept of human personality that expectations, attention, and trust play a central role in changing organizations.

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# Does marriage and having children crowd out employees' intrinsic motivation?

Yannis Georgellis, Thomas Lange, Vurain Tabvuma<sup>24</sup>

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## Abstract

This paper investigates how major life events, such as marriage and childbirth, affect employees' intrinsic motivation. We hypothesize that major life events change employees' perceptions and priorities, resulting in value incongruence between their values and those of the organization they work for. Using large-scale longitudinal data, we find that marriage and the birth of the first child exert a significant detrimental effect on intrinsic motivation, which persists for up to five years. Such a detrimental effect is most prevalent in the case of female public sector employees. Accordingly, this paper offers some of the first evidence on non-work related factors as determinants of intrinsic motivation and a novel perspective on the work-life conflict debate.

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## Applying versus buying:

# neural correlates of first choice employer brands and similarities and differences to first choice consumer brands

Linn Viktoria Rampl<sup>25</sup>, Christian Opitz, Isabell Welpel, Peter Kenning

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### Abstract

Employer branding is becoming increasingly important for organizations: First, knowledge intensive products and services require a highly skilled and motivated workforce. Second, the demographic development and its resulting shortage of talents make successful recruiting of a competitive factor. Third, globalization leads to more competition for personnel, even across national borders. Despite the great importance of employer branding, we know only little about how employer brands are processed and how preference decisions of potential employees are made. A functional magnetic resonance imaging (fMRI) study was applied to investigate the neural correlates of potential employees for decisions with or without the first choice employer brand (FCB). For the FCB decisions increased activation was found in areas associated with processing of emotions. Decreased activation was found in areas associated with reasoning. However, compared to the FCB effect for consumer brands, the FCB decisions did not decrease reasoning with a similar magnitude. These results provide directions for future research, e.g. the complexity of long-term brand-related decisions.

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# Reevaluating the “prominent deck B phenomenon” in the revised gamble with compounded version of IGT and inverse IGT

Yao-Chu Chiu, Yu-Kai Lin, Tzu-Jiun Song, Shi-Shih Yen, Ching-Hung Lin<sup>26</sup>

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## Abstract

Damasio proposed the Somatic Marker Hypothesis (SMH) and Bechara et al. (1994, 1997) provided the Iowa gambling task (IGT) to demonstrate the function of emotion which can implicitly facilitate the decision makers to make the rational choice under uncertainty. IGT is a four-choice (A, B, C, D) gamble and the serial studies indicated that decision makers can foresight the long-term benefit (approach the good final-outcome decks C and D). Moreover, the Iowa group provided the inverse version of IGT (*i*IGT, Bechara et al., 2000) to double check the generalizationability of SMH. The *i*IGT result suggested decision makers still preferred the good decks *i*A and *i*B and this finding solidly supported SMH again. However, some studies consistently revealed that decision makers preferred the bad deck B (Wilder et al., 1998), which is against the original observation of IGT. Additionally, there have two studies pinpointed that normal subjects avoided choosing the good deck *i*B in the *i*IGT (Chiu & Lin 2007; Fernie 2007), which also against the original finding of *i*IGT (Bechara et al., 2000). These studies suggested the gain-loss frequency can be the main guiding factor for decision. To simply clarify the argument between the two viewpoints of long-term outcome and gain-loss frequency in interpreting the choice behavior under uncertainty, we combined the IGT and *i*IGT and proposed the four simple versions of IGT (A-*i*A-A-*i*A; B-*i*B-B-*i*B; C-*i*C-C-*i*C; D-*i*D-D-*i*D). There have 178 college students (93 males) participated in the study and randomly assigned to the four versions. The present results of four experiments mostly supported the viewpoint of gain-loss frequency, but not long-term outcome. In the decisive B-*i*B-B-*i*B version, subjects preferred the bad deck B greatly than good deck *i*B, which can be only interpreted with the gain-loss frequency. Consequently, the SMH should be revised according to the alternative viewpoint, gain-loss frequency.

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# Reexamining effect on risk behavior of prior gain-loss in a dynamic gambling task

Ching-Hung Lin, Jing-Long Tsai, Tzu-Jiun Song, Yu-Kai Lin, Yao-Chu Chiu<sup>27</sup>

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## Abstract

Gehring and Willoughby (2002) provided a two-choice dynamic gamble (called the GW gambling task, GWGT) to demonstrate that an event-related brain wave, medial frontal negativity (MFN), can be used not only to monitor performance (correct action vs. incorrect action), but also to represent internal utility and as a predictor of risk behavior. Normal decision makers can be risk-averse (preferring lower-risk choices) after making a big gain (BG), as revealed by MFN, and vice versa. The probability of risk behavior was related to prior outcomes ( $BG < SG < SL < BL$ ). The GWGT finding demonstrates that the preceding gain-loss experience influences choice behavior and a linear function predicts choice behavior under uncertainty. To verify the original GWGT finding, 51 college students (32 female) were recruited to play 96 trials of a computer version of GWGT. The results revealed that the probability of risk choice for big loss is significantly larger than that of the other three conditions ( $BL > BG$ :  $P = .024$ ;  $BL > SG$ :  $P = .004$ ;  $BL > SL$ :  $P = .033$ ). However, no significant differences for the probabilities of risky choice were found between the other paired conditions ( $BG = SG = SL$ ). This investigation partially supported the original finding concerning GWGT ( $BL > SL$ ). In contrast, parts of the present observation contradicts to the original result in the GWGT ( $BG < SG < SL$ ). Namely, the BG condition did not make subjects become more risk aversion than did the SG condition as shown in the original GWGT result. Although some previous literatures on behavioral decision-making (Thaler and Johnson, 1990) have discussed the effects of prior outcomes on subsequent choices, the both research paradigms (dynamic game vs. questionnaire) were different. In the near future, we needed additional evidences of utilizing the dynamic game (such as GWGT) and behavioral decision paradigm simultaneously (such as a questionnaire) to further clarify the relationship between risky behavior and prior gain-loss experiences.

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# Foresighted or myopic choice behavior in Iowa gambling task:

## evidence from securities traders

Tzu-Jiun Song, Ching-Hung Lin, Da-Bai Shen, Yao-Chu Chiu<sup>28</sup>

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### Abstract

The Iowa Gambling Task (IGT) has recently been adopted extensively in assessing the choice behavior under uncertainty by the frontal lobe lesions and normal decision-makers. In the IGT-related literatures, patients with ventromedial prefrontal lesions choose less advantageous decks (“myopia for the future”) than normal subjects (“sensitive to future outcome”) (Bechara *et al.*, 1994; Bechara *et al.*, 2000). Notably, few studies have directly utilized the IGT to probe the risk behavior of experts in securities markets (such as securities traders). Hence, this investigation considers the foresight of securities traders in performing IGT, with an emphasis on whether they choose more advantageous decks and avoid disadvantageous decks. For this study, 17 securities traders in a single securities corporation (eight males, nine females) were recruited. They had an average age of 39.4 years old, and an average seniority of 14.3 years. After the experiment, all subjects were asked, “if you play again, which deck you would prefer to choose?” The results demonstrate that subjects significantly preferred deck B (large gain-loss value, high-frequency gain, with a negative future-outcome) rather than decks A, C, or D in the IGT ( $F_{(3, 48)} = 7.33, p < .01$ ). Furthermore, no significant difference was found between the mean number of disadvantageous (A+B) and that of advantageous (C+D) decks ( $F_{(1, 16)} = 1.55, p = .23$ ). The results of the post-experimental questionnaire indicated that 41% (7/17) of the subjects chose the *bad deck B*. In summary, this study did not fully observe foresighted behavior by the group of securities traders. This tendency of deck B-preference is similar with the observation of previous IGT-related investigations (Wilder *et al.*, 1998; Fernie *et al.*, 2006; Lin *et al.*, 2007). Securities traders seem incompletely sensitive to future outcomes not only when playing the IGT, but also according to the post-experimental questionnaire.

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## Intuitive decisions:

# the influence of phonetic and letter frequency recognition heuristics on brand selection decisions

Benjamin Rubenwolf<sup>29</sup>, Matthias Spörrle

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### Abstract

Can the recognition of a single letter or syllable as part of a brand name lead to increased levels of brand recognition and, thus, brand preference? Based on recognition heuristics we hypothesized brand names containing words and syllables frequent in language should be preferred compared to brand names including less frequent words and syllables. For instance, if individuals have to choose between (otherwise identical) brand names containing the letter “E” or “U” (corpus-based frequencies: E = 17.4%; U = 4.4%), we hypothesize that people preferably choose the brand containing the letter “E” instead of “U.” Three studies (N = 812) were designed to explore the influence of recognition heuristics based on letter and syllable frequency on brand preference. We derived the frequency of single letters and syllables within the German language on basis of existing corpus-based letter and syllable frequency analyses. By using real brands (controlling for brand popularity) as well as artificially created brand names we examined participants’ brand choice behavior when being confronted with two alternative brand names. Participants were consistently more likely to choose the alternatives with higher letter- or syllable frequency. The same effects were obtained for real brand names with equal levels of brand popularity as well as for artificially created brand names composed of syllables of different frequencies. We found evidence for an influence of letter- and syllable frequency in everyday speech on consumer brand preferences. In line with the recognition heuristic, consumers prefer brand names on basis of previous exposure to the letters and syllables the name consists of.

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# Knowledge nudges you into nibbling nature: obesity risk knowledge as a sensitizer for ecological food choice

Birgit Haller<sup>30</sup>, Matthias Spörrle

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## Abstract

From the consumer's subjective point of view organic food is associated with healthy and low-calorie nutrition (Schuldt & Schwarz, 2010), even though there is no empirical evidence for a better nutrient quality of organic food compared to conventional food (Dangour, Dodhia, Hayter, Allen, Lock, & Uauy, 2009). Therefore, we assumed that people who are motivated to avoid unhealthiness and overweight should choose foods associated with healthiness (i.e., organic foods). Moreover, this motivation should be especially high in people who are aware of the risks of an unhealthy, high-calorie nutrition, wherefore we hypothesized that increased levels of obesity risk knowledge should result in higher levels of ecological food consumption. We further assumed that, in the sense of a sensitization, this relationship is mediated by awareness for a healthy nutrition. A cross-sectional, correlational survey (N = 255) was conducted in order to investigate this so far unexplored relationship. A multiple hierarchical regression analysis and a mediation analysis based on bootstrap sampling was used to test our hypotheses. Organic food consumption was significantly predicted by obesity risk knowledge (Beta = .16,  $p < .01$ ) and the relationship was partially mediated by nutritional awareness (95% CI .007 to .078). This study shows the so far undiscovered role of obesity risk knowledge as a sensitizer of organic food consumption, thus underscoring the importance of enhancing knowledge about the risks of obesity as it influences the consumption of healthy and ecologically manufactured foods. Furthermore, it can be deduced that people participating in weight-loss classes or other people with a special interest in low-fat nutrition represent an important target group for organic food providers.

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# The direct and indirect effects of the attractiveness-gender bias on social interaction and hiring intentions in an employee selection scenario: the moderating influence of social comparison orientation

Kerstin Nachtigall<sup>31</sup>, Maria Agthe, Matthias Spörrle

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## Abstract

According to research on the attractiveness-gender bias in applied settings, attractive same-sex job applicants evoke negative judgments of the evaluator whereas positive evaluative reactions are elicited by attractive opposite-sex candidates. Recently research has started to examine potential moderators of this bias. Our study aims at extending this current research by examining, for the first time, the potentially moderating influence of the evaluator's social comparison orientation on the emergence of this bias. We hypothesized the bias to be stronger for evaluators with increased downward social comparison orientation as they might be particularly vulnerable to self-threatening attractive same-sex targets. Overall, 480 participants imagined themselves as a staff manager of a company and evaluated a candidate, after having read an application including a photograph (attractive vs. unattractive), of the alleged applicant (female vs. male). Replicating existing research, the attractiveness-gender bias was found regarding to the desire to socially interact with the target. Moreover, mediation analysis confirmed that the employment decision was indirectly affected by the attractiveness-gender bias through desire for social interaction. More importantly, examining the influence of social comparison orientation on the effects of the bias, we found the bias to be stronger for respondents with High levels of downward social comparison orientation. Confirming a moderation of the attractiveness-gender bias via social comparison orientation our findings point to the necessity of considering psychological characteristics of evaluators when examining biased judgment and decision making in applied contexts.

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# Yes, the brand is green, but why should it matter?

## Extending the process model of green brand equity to consumer attitudes and word-of-mouth

Rebekka Hedjasie<sup>32</sup>, Magdalena Bekk, Matthias Spörrle

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### Abstract

Business research has recently introduced the concept of green brand equity which, using a sample of Asian customers of consumer electronics, was found to be positively influenced by green brand image through green satisfaction and green trust as parallel mediators. Examining green brand equity, we first aim to test the robustness of this mediation model in terms of culture (German sample) and product type (goods, services), while controlling for hitherto unaddressed consumer characteristics (age, gender). Secondly, we want to provide first empirical evidence for the potential value of green brand equity when predicting consumer behavior, i.e., brand attitude (BA) and word-of-mouth (WOM). A total of 358 German participants selected one of nine well-known brands from either the product or the service sector, for which they had consumer experience. Participants provided their evaluation of this brand's green brand image, green trust, green satisfaction, and green brand equity as well as their BA and WOM behavior. We confirmed the multiple mediation model in the new cultural context, for goods and services, while controlling for socio-demographic covariates; we also detected significant positive direct effects of green brand equity on BA and WOM. Our findings replicate a model bridging the gap between green brand image concepts and green brand equity across cultural contexts and product types and provided first empirical evidence for the relevance of green brand equity as a predictor of important aspects of consumer behavior. Hence, green brand equity can be regarded as a determinant of a company's economic success.

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## Mother earth is calling!

# Gender dimensions of brand personality as incrementally predictive indicators of green brand image and the moderating influence of green value orientation

Christoph Hohenberger<sup>33</sup>, Magdalena Bekk, Matthias Spörrle

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### Abstract

As companies note the positive gains of environmentally friendly marketing strategies, going green is gaining center stage among marketing managers. Our research is based on the novel assumption that the gender role of a company or a brand might be an important determinant of its green image: As previous research suggests that femininity is closely related to environment, earth, and nature we hypothesize a positive predictive influence of female gender brand on green brand image. Moreover, we assume this effect to be mitigated by consumers' green value orientation as customers with higher levels of ecological orientation should be less susceptible to the influence of (objectively irrelevant) indicators of a company's green brand image. Participants (N = 358) selected one out of nine well-known brands they had consumer experience with and evaluated this brand's green brand image, gender dimensions, and brand personality. Additionally, respondents completed a measure of green value orientation. Multiple regression analysis confirmed the positive effect of femininity on green brand image, even when controlling for socio-demographic characteristics as well as brand personality. Moreover, as hypothesized this association was found to be moderated by green value orientation. If companies want to unostentatiously change their brand image into a more environmentally friendly direction, they should create a more feminine brand personality when communicating to consumers. The effects of such campaigns are likely to be less profound for consumers with a high green value orientation.

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# Representativeness and conservatism in Bayesian updating:

investigating rational and boundedly rational decision making by means of error rates, response times, and event-related potentials

Sabine Hügelschäfer<sup>34</sup>, Anja Achtziger, Carlos Alós-Ferrer, Marco Steinhauser

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## Abstract

By means of a Bayesian inference task (Grether, 1980), the conflict between heuristic and rational decision strategies of human economic decision making was examined. Particular focus was on participants' error rates, response times, and event-related potentials (ERPs). Results revealed that, depending on several situational and person factors, a controlled process leading to Bayesian updating is often perturbed by other processes which partly exhibit more automatic characteristics. Conflict between Bayesian updating and the representativeness heuristic led to increased error rates and response times. This conflict further elicited a strongly pronounced N2, a component which is thought to reflect pre-response conflict. The extent to which participants were able to detect this particular conflict was reflected in the magnitude of their individual N2 amplitude. Large N2 amplitudes increased the probability that such conflicts between a controlled and a more automatic process were detected and consequently resolved in favor of the former. Furthermore, a tendency to solely rely on base-rates (conservatism) was observed in participants' amplitudes of the lateralized readiness potential (LRP), an ERP which indicates the brain's left-right orientation. Large LRP amplitudes (indicating response activation of the response with the higher prior probability) present before the presentation of sample evidence were related to a high degree of conservatism. Conservatism was especially pronounced for individuals who described themselves as intuitive decision makers. On the whole, the results support the argument that decisions in this paradigm can be understood as the result of the interaction of several processes: a simple strategy which considers base-rates only and ignores further evidence (conservatism), an automatic heuristic which ignores prior probabilities and takes into account the sample's similarity to the parent population (representativeness heuristic), and a more controlled process of Bayesian updating which can be considered rational in an economic sense.

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## Eye-tracking:

# status quo and future directions beyond mainstream applications

Monika Koller<sup>35</sup>, Thomas Salzberger, Gerhard Brenner

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### Abstract

Analyzing eye movements has had a long tradition in various scientific disciplines, serving different purposes. In psychology, initial observations of the eye movements in reading date back to the end of the 19th century. In business disciplines, the majority of studies are somehow related to marketing topics. Analyzed eye movement data are used to study attention to advertisements, the usability of websites or help to resolve issues in brand and product management. Given the successful examples for applying eye-tracking in multiple scientific disciplines, it is quite surprising that in marketing research the applications eye-tracking has seen so far are limited to certain topics only. For instance, eye-tracking holds a strong but up to now largely unutilized potential to facilitate our understanding of methodological issues and it promises to help improve empirical designs. We propose two potential areas in which eye-tracking could serve as another valuable source of information. These new areas are beyond traditional mainstream applications of eye-tracking in marketing research.

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## Neuroentrepreneurship:

# what can entrepreneurship educators (& practitioners?) learn from neuroscience?

Norris Krueger<sup>36</sup>

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### Abstract

Understanding entrepreneurial behaviors requires understanding entrepreneurial thinking at a deeper level (e.g., Krueger 2007). The nascent field of neuroentrepreneurship has already enabled a rich, growing research agenda to improve and enrich our understanding of entrepreneurial phenomena. However, there is immense potential for insights from neuroscience to provide mechanisms for advancing entrepreneurship teaching (and perhaps practice). For example, neuroscience already offers us a powerful alternate key assumptions about the genesis of entrepreneurial decision making. These in turn have profound implications for how we can best encourage the entrepreneurial mindset. We begin with an overview of how insights from neuroscience methodology can address these challenges and help extend entrepreneurship theory. We provide a review of key existing studies, adapt and enrich n existing model of entrepreneurial learning (Krueger 2007) and propose a useful agenda for research into entrepreneurial learning.

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## Why do people cooperate?

### The role of behavior-associated genes in individual decision-making

Vanessa Mertins, Andrea B. Schote, Wolfgang Hoffeld<sup>37</sup>, Michele Griessmair, Jobst Meyer

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#### Abstract

Robust empirical evidence shows that individuals cooperate more than predicted by standard economic theory, thus, calling into question the rational and selfish decision-maker. For instance, it has been shown that in public good games, participants contribute a significant amount of their initial endowment even when no contribution is the dominant strategy. Furthermore, significant individual differences in contributions (e.g., based on gender, nationality, and education) as well as different types of contributors (e.g., conditional cooperators, reciprocators, free-riders, etc.) have been identified. The origin of voluntary cooperation and individual heterogeneity thereof is still subject to ongoing discussion. Recently, a number of empirical studies found evidence for the heritability of economic behavior suggesting that cooperation might also be influenced by genetic predisposition. So far, only a limited number of studies combined behavioral genetics with economic experiments in order to identify the genetic foundations of cooperation. In the present study, we conducted an incentivized economic experiment measuring individuals' willingness to contribute voluntarily to the provision of public goods. In order to get subsequent genotyping subjects donated buccal cells. Preliminary results show that genetic predisposition indeed influences contributions as well as expectations about others' contributions. Additionally, we found that gene-environment interaction plays a major role.

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# The influence of affect induction in the ultimatum game on decision-making and feedback-related negativity

Patrick Mussel<sup>38</sup>, Johannes Hewig, John J. B. Allen, Michael G. H. Coles, Wolfgang H. R. Miltner

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## Abstract

The Ultimatum game is a social interaction between two players, with a proposer dividing a sum of money in two parts, and a responder deciding whether to accept or reject the offer. While rational choice theory predicts that responders accept all offers, individuals largely deviate from these predictions and reject unfair offers, leading to a loss for both, the proposer and the receiver. While recent research incorporated psychological variables, such as emotions, in order to more fully understand player's behavior, less is known about how attributes of the social interaction impact decision making and underlying cognitive and emotional processes. The present study investigates whether behavior of the proposer impacts rejection rates and feedback-related negativity, an event related brain potential that has been interpreted in terms of reinforcement learning theory to indicate events that indicate punishment and are "worse than expected". Especially, we expected that offers from non-smiling proposers, compared to smiling proposers, elicit stronger feedback-related negativity and, consequently, are more often rejected, compared to offers from smiling proposers. While our results were generally confirmed, a moderating effect of gender was observed, with offers from male proposers to female receivers showing a reversed pattern. It is concluded that predictions of bargaining behavior have to take aspects of social interaction as well as stereotyped gender effects into account.

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## Sex sells?

# How gender moderates the effects of arousing advertising stimuli on purchase intention and willingness to pay

Jenna Nenninger<sup>39</sup>, Björn Behn, Viola Benz, Caroline Leder, Marc Linzmajer, Marco Hubert

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### Abstract

The use of arousing content in advertisement became more and more frequent and explicit in the past decades. Arousing stimuli in advertisements are being used for almost any type of product. However, previous research showed significant gender differences in responding to arousing visual stimuli. Our study investigates gender-dependent effects of arousing stimuli on purchase intentions and willingness to pay (WTP). Our research revealed that while men's purchasing behavior was not significantly influenced by the arousing stimuli, women displayed a significantly lower WTP as well as a significantly lower disposition to purchase the offered products to a given price.

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# Integrative ethics management systems in family firms:

## an exploratory approach

Angela Poech<sup>40</sup>, Felicitas Kriwanek

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### Abstract

Research of business ethics is mainly focused on large public companies or – if family businesses are at the core of the analysis – targets sub-aspects, i.e. corporate social responsibility. It is an important research question to analyze value orientation and ethics management systems in family firms, particularly in comparison to non-family firms. The research project is carried out using a two-level-analysis: (1) To systematically evaluate, analyze, and structure criteria and instruments of an ethics management system in family firms in comparison to non-family firms. (2) To verify a hypothesized existing relationship with the degree of family involvement in the business, measured by the family influence indicator F-PEC scale (Klein 2004). To attain research goal (1) a pilot study of six semi-structured interviews (three of them family firms) has been conducted and analyzed on the basis of a grounded theory approach. Research goal (2) will be met by conducting a questionnaire-based survey to assess the criteria of an ethics management system as evaluated in the first step of the research plan. Initial results show that family firms and non-family firms mainly commit to a similar set of values, while family firms express a higher commitment to respect stakeholder rights (vs. shareholder orientation in non-family firms). Additionally, significant differences can be found in how these values are applied by the members of the firm: While both groups use mission statements to announce a given set of values, the integration of these values into behavioral codices is implemented to a higher degree in family firms than non-family firms. Interestingly, family firms are held to be more capable of convincing employees to act upon the firm values. Control instruments, like sustainability reports and auditing systems, are more important for non-family firms, while family firms rely upon instruments with less organizational implications and cost.

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# Emotional experiences as drivers of successful employer branding?

## Testing the somatic marker hypothesis with fMRI

Linn Viktoria Rampl<sup>41</sup>, Christian Opitz, Isabell Welpé, Peter Kenning

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### Abstract

This paper aims at testing a neural theory, the Somatic Marker Hypothesis (SMH), in an employer branding context. The SMH postulates that decisions are affected by somatic marker signals that arise in bioregulatory processes, such as emotions. Previous studies have shown that somatic markers influence decision making even before being consciously aware of an underlying reason for a choice. While general branding research has stressed the importance of emotions, particularly regarding employer branding more research is needed. A functional magnetic resonance imaging (fMRI) study was applied to examine whether previous emotional experiences with a potential and preferred employer brand lead to differences in neural activations in decisions including this employer brand. Compared to participants of a control group who had no such previous emotional experiences with their preferred employer brand, increased activation was shown in the ventromedial prefrontal cortex. This area is postulated to be critical for the processing of somatic markers. These first results are in line with the SMH and provide the basis for future research regarding drivers of successful employer branding methods.

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# The role of oxytocin in social norm enforcement

Mirre Stallen<sup>42</sup>, Ale Smidts, Carsten K.W. de Dreu, Alan G. Sanfey

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## Abstract

The hormone oxytocin has long been considered important for prosocial behavior, with researchers exploring factors such as trust, empathy, cooperation, and generosity. However, contrary to the popular belief of oxytocin being a ‘love hormone’, recent studies are beginning to suggest that oxytocin does not necessarily lead to indiscriminately prosocial behavior, but rather that its effects are context-dependent and that this hormone may play a role in a broader range of social behaviors. The aim of this study is to explore the possible effects of oxytocin on social norm enforcement. If oxytocin does indeed play a key role in social behavior, then does administration of oxytocin foster the choice to punish social norm violators? Or rather might oxytocin lead to greater willingness to compensate the victim of a social norm violation? To investigate the role of oxytocin on social norm enforcement, we are conducting a between-subject, double-blind, placebo-controlled, functional neuroimaging experiment in which participants play three versions of a monetary game: a second-party punishment game, a third-party punishment game and a third-party compensation game. If the effect of oxytocin does extend into a wider range of social behavior, we expect that participants who received oxytocin respond more intensely to social norm violations and therefore show more punishment and/or compensation behavior than participants in the placebo group. Behavioral and neuroimaging (fMRI) results will be conducted and presented in order to assess the behavioral and neural effects of oxytocin in the context of social decision-making.

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# The neural basis of relational models: applications in management research

Maria Strobel<sup>43</sup>, Andranik Tumasjan, Isabell Welp

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## Abstract

Relational models theory (Fiske, 1992) posits that the organization of all social interactions can be described in terms of four elementary relational models: communal sharing, authority ranking, equality matching, and market pricing. A large body of empirical research across different contexts demonstrates that individuals and groups indeed use these models to organize the majority of their social interactions. Based on previous research (Iacoboni et al., 2004), we explore possibilities for investigating the neural mechanisms underlying the implementation of these four basic types of social relations. We discuss how the understanding of the neural processes underlying the use of relational models can contribute to our understanding of organizational and managerial decisions and behavior.

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# Functional neuroimaging of media brand attractiveness

Aniko Sztrokay<sup>44</sup>, Evgeny Gutyrchik, Maximilian Reiser, Kai Fehse, Ernst Pöppel, Thomas Meindl

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## Abstract

Research in decision science can be based on descriptions of neural processes that are responsible for the choice of an action. An interesting focus of fMRI-studies is how a decision process takes place in brand related behavior. Here we investigated brain activation patterns related to the attractiveness of three popular media brands with functional magnetic resonance imaging (fMRI). One of three Media Brand showed the lowest activation in the ACC/MPFC and yet got the best subjective evaluation. That result exhibits an intriguing contrast with the research to date. We interpret the deactivation with strong media brands as greater effort in the assessment of weaker, less self related brands. We speculate that the brand with the strongest affinity to the self needs less brain resources during decision making processes. The seemingly effortless processing of the brand with higher attractiveness generates interesting questions for further research in and communication and consumer neuroscience.

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# Prior and likelihood uncertainty are differentially represented in the human brain

Iris Vilares<sup>45</sup>, James D. Howard, Hugo L. Fernandes, Jay Gottfried, Konrad Kording

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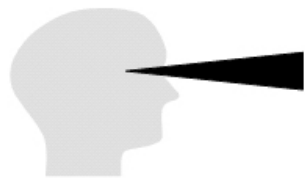
## Abstract

Many experiments in motor control have shown that humans, when performing a movement (for example an arm-reaching task), can integrate information both from past history of movements (prior) and available sensory feedback (likelihood). Moreover, they seem to integrate prior and likelihood based on the respective uncertainties, in a way that is often close to the Bayesian optimal. This means that uncertainty in both the prior and the likelihood needs to be encoded somehow in the human brain. However, how and where it is encoded is still largely unknown. Here we wanted to know first if human behavior is also close to optimal in a more cognitive task and second, which brain areas are involved in representation and integration of prior and likelihood uncertainty, and whether these areas overlap. A total of twenty-seven adult subjects participated in the behavioral portion of this study. Each subject performed a decision-making task which consisted of guessing the position of a hidden target on a screen. The position of the target was sampled from a 1-D Gaussian distribution (the prior) in which the mean was fixed and the variance was kept constant inside each block of trials, but changed between blocks. In every trial 5 dots were shown in the screen (the likelihood), whose x-position was drawn from another 1-D Gaussian distribution, in which the mean was the hidden target and the variance changed randomly between trials. The subjects then tried to guess the position of the hidden target and, after the choice was made, the real position of the target was shown. Fifteen of these subjects then performed the same task in an fMRI scanner. We found that people readily combined information from both the position of the likelihood dots as well as previous knowledge about the target distribution in a way similar to the predictions from Bayesian decision theory. Analysis of the fMRI results showed that higher prior uncertainty was correlated with stronger activations in the insula, orbito-frontal cortex, amygdala and putamen. Higher uncertainty in the likelihood, on the other side, activated areas in the visual cortex, which do not disappear after controlling for potential confounds such as foveal representation. This suggests that the uncertainty associated with visual sensory feedback may be preprocessed already in the visual cortex, while prior uncertainty might be represented more deeply in the brain. Our results indicate that the human brain makes use of different pathways to represent and integrate uncertainty about prior and likelihood, and offer a potential neural mechanism for optimal Bayesian decision making.

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## 2012 Call for papers

Please be invited to submit a paper to the 2012 NeuroPsychoEconomics Conference in **Rotterdam, The Netherlands**. The conference will be held from **June 14-15, 2012** at Rotterdam School of Management, Erasmus University (Woudestein Campus, Burgemeester Oudlaan 50, 3062 PA Rotterdam, The Netherlands). Conference co-chairs are **Ale Smidts**, Professor of Marketing Research at Rotterdam School of Management and **Alan Sanfey**, Principal Investigator in Decision Neuroscience at the Donders Institute for Brain, Cognition and Behaviour, Radboud University Nijmegen. The **deadline for submissions** is **March 1, 2012**.

The conference theme of 2012 is:

### “Integrating Neuroscience with Research in Economics, Management, and Marketing”

Manuscripts should combine concepts from neuroscience and/or psychology with problems of economics and management/marketing. Topics may include (but are not restricted to):

- Application of concepts and methods from neuroscience and/or psychology in solving economics and management/marketing problems (e.g., consumer decision-making, behavioral finance, organization science, management, and decision science)
- Analysis of interpersonal behavior (e.g., relationships between customer-supplier, supervisor-subordinate, and/or investor-firm) with the means of neuroscience and/or psychology
- Discussion of ethical and legal issues at the interface of psychology, neuroscience, and business and economics research
- Evaluation of the state of the field of research in neuroeconomics
- Presentation of state-of-the-art techniques for solving neuroeconomic problems (e.g., fMRI, DTI, EEG/ERP, SCR)

Empirical as well as conceptual manuscripts are welcome. Manuscripts submitted for the conference must not be published elsewhere at the time of the conference. The conference language will be *English*.

### Full paper submissions

- Manuscripts for the 2012 NeuroPsychoEconomics Conference must be submitted **by March 1, 2012**.
- *Full paper submissions* passing the double-blind review process will be accepted for presentation in a competitive paper track. Manuscript submissions must be accompanied by a cover letter that indicates the authors' intention to publish the paper, if accepted, either in full in the “*Journal of Neuroscience, Psychology, and Economics*” (ISSN 1937-321X) or in abstract form in the “*NeuroPsychoEconomics Conference Proceedings*” (ISSN 1861-8243). The cover letter should also include the names and affiliations of all coauthors as well as an e-mail address of the corresponding author.
- Manuscripts must conform to the author guidelines of the American Psychological Association (APA). Please see <http://www.jnpe.org> for more submission information. The submission website can also be found here: [http://www.jbo.com/jbo3/submissions/dsp\\_jbo.cfm?journal\\_code=nlpe](http://www.jbo.com/jbo3/submissions/dsp_jbo.cfm?journal_code=nlpe).
- In submitting a manuscript, the authors affirm that, if accepted, at least one author will register for the 2012 NeuroPsychoEconomics Conference and appear at the conference to present the paper.



## Poster submissions

- Posters for the 2012 NeuroPsychoEconomics Conference must be submitted **by March 1, 2012**.
- Posters passing the double-blind review process will be accepted for presentation at the conference. Poster submissions must be accompanied by a cover letter that indicates “poster submission,” an extended abstracts (1,000 words max.) that describes the research presented on the poster, and a short abstract (300 words max) for inclusion in the “*NeuroPsychoEconomics Conference Proceedings*” (ISSN 1861-8243). The cover letter should also include the names and affiliations of all coauthors as well as an e-mail address of the corresponding author.
- *Poster submissions* (that is, extended abstracts) must conform to the author guidelines of the American Psychological Association (APA). Please see <http://www.jnpe.org> for more submission information. The submission website can also be found here: [http://www.jbo.com/jbo3/submissions/dsp\\_jbo.cfm?journal\\_code=npe](http://www.jbo.com/jbo3/submissions/dsp_jbo.cfm?journal_code=npe).
- Posters to be presented at the conference may have a maximal size of 120cm (height) x 90cm (width).
- In submitting a poster, the authors affirm that, if accepted, at least one author will register for the 2012 NeuroPsychoEconomics Conference and appear at the conference to present the poster.

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