

Tuesday 25/09/18

**16:00**

**R 511**

# Cognitive Models I



# Tjaša Omerzu

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## Establishing judgment policies in the absence of feedback

(Tjasa Omerzu, Maarten Speekenbrink, Janina A. Hoffmann)

The ability to make judgments is a core capacity in personal and professional life. Individuals spontaneously form impressions about strangers based on their clothing style or facial expressions and employees prioritize their daily duties according to urgency and importance. In those daily judgment situations, individuals often evaluate the object under consideration based upon subjective standards without receiving objective feedback. Our study aimed to disentangle which statistical properties of the environment attract people's attention and to infer the degree to which participants jointly consider several pieces of information. Particularly, we investigated if people preferably attend to cues that provide highly variable information or to cues that convey more information. Second, we investigated to what degree people only rely on one cue or integrate information from several cues. To test those predictions, participants intuitively judged abstract stimuli consisting of three cues on a self-defined scale from 0 to 100. One of the cues systematically differed from the other cues in its variability and informativeness, allowing us to contrast across several conditions whether variability or informativeness plays a larger role for judgment formation. The results suggest that on average participants developed highly consistent judgments during the experiment but judged the same stimuli less consistently in conditions in which the cues provided less variable information. Moreover, to address the question of how many pieces of information participants considered, we estimated four linear regression models to participants' judgments in the last training block and predicted their judgments for unseen test objects. This analysis revealed that participants weighted all cues equally in their judgment and, as suggested in a follow-up study, those intuitive judgments were learned successfully by another person - though not to the same level of consistency. Taken together, these results suggest that participants were able to learn intuitive judgments and the study gave us some insight into the way they are formed.



# Nadiia Makarina

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## Attentional processes in multiple-cue judgments

(Nadiia Makarina, Janina A. Hoffmann)

Attentional processes in multiple-cue judgments. To make accurate everyday decisions, individuals need to find out which pieces of information are relevant for the decision at hand and which aspects they can ignore. For example, when booking a plane ticket to attend a conference one might consider departure time and flight duration more important than baggage allowance. Yet, how individuals weigh these different aspects in their decision may change as a function of the situational context or time. For instance, baggage allowance may suddenly become highly important when planning a vacation with the family. The present study addresses the question of how basic attentional mechanisms interact with the importance people assign to different aspects and thereby allow individuals to detect and adapt to changes in the features' importance. Specifically, past research suggests that individuals pay more attention to salient information, if they do not possess much prior knowledge about the decision task, but attention shifts towards more predictive features as a result of learning. However, it is still unclear whether individuals preferably adjust their hypotheses about each features' importance based upon the salience of the features or their previously learned importance. To contrast these two attentional mechanisms, participants will learn to predict in an initial learning phase which features are more or less important for making a correct judgment based on feedback. In a subsequent relearning phase, a different set of features is important for making an accurate judgment and participants need to correct their initial predictions. This relearning paradigm allows to disentangle whether judgment error, resulting from the change in the judgment task, is attributed more strongly to a previously important feature or a currently more salient one. Taken together, the present study aims to gain a deeper understanding of attentional processes in multiple-cue judgments and learning process.



# Ruchira Suresh

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## Perceiving sequential percentage changes

(Ruchira Suresh, Hansjörg Neth, Wolfgang Gaissmaier)

Numerical formats such as frequencies and percentages are used to communicate (sequential) changes (e.g., of stock prices, price discounts, or GDP rates). Research has shown that people make systematic errors in interpreting the overall effect of sequential percentage changes. Specifically, people appear to employ an additive strategy as opposed to a complex multiplicative strategy to estimate the aggregate result of such changes. Assuming that people use an additive strategy, we investigate the factors governing the amount of happiness people feel when evaluating sequential percentage changes. In a description-based study, 360 participants repeatedly compared between two investments: Stock X (single change) and stock Y (double change, e.g., involving a personal gain  $G$  and a loss  $L$ ). We varied the order and duration of sequential percentage changes and assumed that — other things being equal —  $L$  followed by  $G$  is preferred to  $G$  followed by  $L$  and long  $G$  and short  $L$  is preferred to short  $G$  and long  $L$ . The mean overall accuracy was 40.1%, indicating that people indeed erroneously estimate sequential percentage changes. Average preferences were different across hypothesized conditions. There were no main effects of order or duration. However, people seemed to prefer the double change lesser in the short  $G$  and long  $L$  condition (5.1%) as compared to the short  $L$  and long  $G$  condition (23.6%), indicating differences in preference for Stock Y, due to an interaction between order and duration. The follow up experiments aim to explore the differences in the hypothesized conditions in detail.



## Maik Bieleke

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### **It's about time: How Do Intuition, Strength of Preferences, Cognitive Effort, and Swiftness Conjointly Determine Decision Times?**

(Maik Bieleke, David Dohmen, Peter M. Gollwitzer)

We investigate the cognitive underpinnings of decision times in standard binary-choice dictator games. Across three experiments, we varied whether material self-interest was involved, instructed participants to process information intuitively versus reflectively, and measured external indicators of intuition and preferences. People acted either as decision-finding types who always actively thought about which alternative to choose, or as decision-implementing types following pre-thought decision plans. Adopting a diffusion modeling approach, we demonstrate how intuitive inclinations, strength of preferences, cognitive effort, and swiftness jointly determine decision times. As an intriguing implication, we show that decision-finding types are faster when their intuitions and preferences are aligned. They also care similarly about decisions irrespective of their material self-interest but hesitate when their social orientations differ from the perceived social norm. Our research thus sheds nuanced light on the cognitive processes behind decision times.



Tuesday 25/09/18

**16:00**

**R 512**

# Risk I and Cooperation



## Hartmut Esser

University of Mannheim  
Faculty of Social Sciences

### **Rational Choice or Framing? Rational Choice Theory and the Model of Frame Selection as Two Approaches to Explain the Patterns in the Fehr-Gächter-Experiments on Cooperation and Punishment in the Contribution to Public Goods**

(Hartmut Esser)

The experiment by Fehr and Gächter from 1999 is a wide acknowledged contribution to the explanation of effects of punishment-options in the production of collective goods by Rational Choice Theory (RCT) extended by social motives. Large parts not only in sociology assume however RCT as basically unsuited, especially because the influence of “meaningful” symbols to explain the constitution of social processes would not be capable with it. The contribution investigates the scope of a version of RCT extended by motives of reciprocity with the model of frame selection (MFS), which contains in its core effects of the “definition of the situation”. Main result is that most findings can be reconstructed by means of both approaches, but also that one of the results contradicts even extended versions RCT in one of its core assumptions. In an independent empirical test the hypotheses of the MFS are clearly confirmed. The finding implies the refutation of one of the central assumptions of any kind of RCT: that processes of a “definition of the situation” would be hardly more than “cheap talk” or could easily be incorporated by further extensions of its core assumptions concerning effects of the “meaning” of symbols.



# Matthias Stefan

University of Innsbruck

## The Risk Elicitation Puzzle Revisited

(Felix Holzmeister, Matthias Stefan)

Given that risk is an integral component of many economic decisions, the question of how to properly elicit individual-level risk preferences is of substantial importance. Numerous methods to elicit and classify people's risk attitudes in the laboratory have evolved. However, evidence suggests that people's attitudes towards risks may change considerably when measured with different methods. These findings on the so called risk elicitation puzzle have widely been interpreted as evidence for inconsistent behavior. In our study, we conducted a within-subject study with 198 participants answering four different, widely used risk elicitation methods. For each method we additionally asked subjects a range of survey questions and elicited their numeracy and characteristics, in order to relate them to the observed behavior in the risk elicitation methods. Our main finding is that subjects are surprisingly well aware of their seemingly inconsistent choice structure. This indicates that they deliberately and knowingly make choices than can be characterized by different risk attitudes. Other factors, such as numeracy, understanding of tasks, and assignment of domains do not explain the observed (in)consistency across methods. The results of our study call into question the common interpretation of inconsistency in revealed risk preferences.





# Anne-Marie Nußberger

University of Oxford

## Less risk seeking and more indecision in social compared to individual decisions under risk

(Anne-Marie Nussberger, Jim A. C. Everett, Molly J. Crockett, Nadira S. Faber)

Many decisions require us to evaluate risky outcomes that vary in magnitude and probability. Sometimes these outcomes will affect only ourselves (individual decisions), but other times they will affect others (social decisions). And while magnitude and probability have been established as key parameters in individual decisions under risk, it is poorly understood how they factor into social decisions under risk. To address this gap, we presented participants with choices between a small but safe or a larger but risky outcome that varied parametrically in probability and magnitude. For one group of participants, these outcomes affected only themselves (individual decisions), while the other group made decisions about outcomes for others (social decisions). We found that individual decisions were more sensitive to variations in probability and magnitude compared to social decisions, where choices clustered around scale midpoints. Consequently, participants making social decisions were less likely to forgo a smaller but safe outcome in order to take the chances of realising a larger but probabilistic outcome compared to participants making individual decisions. Generalizing across individual differences in risk preferences and empathy, our results point towards people experiencing enhanced subjective uncertainty in social decisions under risk, signified by less risk seeking and indecision. We hope to present further work in progress where we test in how far increased subjective uncertainty or decreased motivation to make accurate choices when deciding for others explain the observed divergences between social and individual decisions under risk.



## Felix Holzmeister

University of Innsbruck

### **What drives risk perception? A global survey with financial professionals and laymen**

(Felix Holzmeister, Jürgen Huber, Michael Kirchler, Florian Lindner, Utz Weitzel, Stefan Zeisberger)

Do Financial Professionals Perceive Risk as Finance Theory Predicts? Despite a long and rich literature on decision making under risk, only little is known on how financial risks are actually perceived. Even less is known about the way financial professionals perceive risk. This paper contributes to a small but growing number of experimental studies examining behavioral aspects in financial professionals' decision making under risk. Utilizing an experimental design which allows for a systematic separation of factors driving risk perception, our study facilitates a more comprehensive understanding of how financial professionals and laymen assess risks in a financial context. To examine the question which distribution characteristics drive the perception of financial risk and the perception to invest in risky assets, we conducted a large-scale experiment with 6,936 individuals from two populations - financial professionals and laymen - in nine countries featuring the world's major financial markets. We exposed participants to nine return distributions with the same expected return and systematically varied standard deviation, skewness, and kurtosis. While standard deviation has no explanatory power for perceived risk, skewness and kurtosis show significant effects. The most striking result, however, is that risk perception and investment propensity are predominantly driven by the probability of incurring a loss. Our results are highly robust and hold for laymen as well as financial professionals. Likewise, the identified patterns driving individual's perception of risk and their willingness to invest are largely akin across all countries in our sample, even though the countries are likely to differ in cultural, societal, and economic aspects.



# Désirée-Jessica Pély

Ludwig-Maximilians-Universität

## What Motivates Gambling?: Experimental Evidence from the Cross-Section and Time Series on Decisions under Risk

(Désirée-Jessica Pély, Theresa Spickers)

Many people gamble and it is still an open question why. In this study we examine dynamic gambling patterns in a controlled laboratory experiment to analyze learning and time-series behavior in gambling. Subjects make repeated decisions about investing their wealth into a skewed and safe asset. We find the following. First, gambling is a function of prior losses and hence gradually decreases over time due to constant learning. Second, despite learning effects, subjects exhibit a strong “gambling for resurrection” preference by increasing their stakes into the gamble in their final decision. Third, subjects who sample and “feel” the high frequency of losses, do not increase decision-making quality. Yet, individual cognitive thinking abilities or a conscientious personality help the gambler to gain a better understanding about the gamble. Lastly, gambling behavior strongly depends on the initial endowment. Results are discussed in light with standard and non-standard economic theories.



Tuesday 25/09/18

**16:00**

**R 513**

# Behavioural Theory



# Gerhard Riener

DICE Heinrich Heine Universität Düsseldorf

## Ambiguous Communication

(Christian Kellner, Mark LeQuement, Gerhard Riener)

Ambiguous language abounds in everyday interaction, whether in political speech, negotiations or contracts. One potential reason is that ambiguity is advantageous to the transmitting side, in that it allows it to better shape the receiver's response to information. Bose and Renou (2014) explore this idea in a mechanism design context, Kellner and Le Quement (2015) apply it to a cheap-talk setting. There, a sender embeds ambiguity into his messages and thereby beneficially shifts the response of the receiver to the (partitioned) information that he provides. Ambiguity, in the form of Knightian uncertainty, is generated by conditioning messages on the payoff-relevant state and on a payoff-irrelevant privately observed event whose distribution is unknown (for example a draw from an Ellsberg urn). For ambiguity averse receivers the use of such ambiguity results in new equilibria which Pareto-dominate equilibria only based on standard, non-ambiguous messages. More specifically, an interval of the (say unidimensional) state space is cut up into two (possibly unequally sized) subintervals, and the sender now randomizes, by conditioning on the Ellsberg draw, between using one pure signaling rule on this subinterval and the reciprocal rule on the complementary subinterval. The key is that the receiver now hedges against ambiguity in responding to messages, which can be shown to imply subjective overweighting of low probability events and thus of the event that the state is located in the less likely of the two subintervals. By inserting ambiguity into her messages, the sender thus achieves an extra degree of liberty in determining the Receiver's response to given information. The above described mechanism is simple and generic in the sense of applying to any signaling game. It is also quite intuitive: the Ellsberg draw could for example be the sender's unobserved mood or whether or not she encountered a black cat on her way to work. We run an experiment aimed at testing the above mechanism with real subjects. We want to entirely focus on the receiver's decision problem of choosing an action as a response to an ambiguous signal generating process and we therefore have subjects facing an automated signal generating process, operating according to a parameter unknown to participants. Our main goal is to test whether this unknown process indeed leads the receiver to shift its response, as predicted theoretically by models allowing for ambiguity aversion. In evaluating subject's behavior, two issues need to be addressed through control treatments. First, could randomization conditional on a non-ambiguous process also have an effect, though this is not predicted by standard expected utility theory? Second, how robust are observed effects to learning, for example in the form of help regarding belief updating provided by experimenters to subjects? Based on a first group of experimental sessions we obtain two main results. First, we find



that the mechanism indeed works as predicted, and the effects appear to be larger for subjects who can be classified as ambiguity averse. Second, perhaps more surprisingly, we find that normal randomization also has an effect even when it should not make any difference given expected utility preferences. We conjecture this could be because participants use a decision heuristic that is based on the conditional probabilities of having drawn a ball of a certain colour. When updating, participants may put too much weight of the prior probability (perhaps due to conservatism bias). If they are aware of their difficulties with updating, this may additionally transform the seemingly unambiguous urn to an ambiguous one. From evaluating a set of control task we conclude that this cannot be entirely be explained as an anchoring effect (even if this might play a role for some subjects). We find that indeed most participants are sensitive to Ellsbergian randomization in this context, and this is the case most markedly for ambiguity averse individuals. Additionally, we also find that similar randomization based on a non-ambiguous urn appears to have a similar effect.

# Stephan Jagau

University of Amsterdam

## Expectation-based games and psychological expected utility

(Stephan Jagau, Andrés Perea)

Psychological game theory has proven to be a potent framework for modeling belief-dependent motivations and emotional mechanisms such as surprise, anger, guilt, and intention-based reciprocity. At the same time, general psychological games significantly raise the complexity bar relative to traditional games and many crucial properties that make the latter easy to work with fail to carry over to the former. Hence it becomes an important issue in itself to figure out which psychological games are tractable enough to be useful for applications in behavioral and experimental economics. In this paper, we contribute towards this goal by identifying a large class of psychological games within which an extension of expected utility is possible. In these expectation-based games, utility depends on recursively constructed summary statistics of players' higher-order beliefs. We argue that expectation-based psychological preferences have a natural and attractive epistemological interpretation and that many applications of psychological games in the literature are expectation-based and admit the psychological expected utility representation. Moreover, we exploit the special structure to develop a generalization of traditional iterated elimination of strictly dominated choices that is shown to be almost as computationally tractable as that traditional procedure. In particular, all commonly studied psychological games turn out to be numerically solvable using standard techniques based on linear programming.



# Dominik Klein

University of Bayreuth and University of Bamberg

## Rationality in Interaction. Rational Choice and Asymmetric Learning

(Dominik Klein, Johannes Marx and Simon Scheller)

This contribution studies temporally extended, iterated decision making in interactive environments. It does so by discussing the results of two agent-based computer simulations. The first of these studies bargaining games in competitive environments. When presented with the opportunity of a joint economic endeavor, agents need to determine how prospective gains are distributed among the participants. A central determinant of their long term income hence is their bargaining strategy. We study long term decision making, where agents are presented with collaboration opportunities time and again and can hence gradually learn about the best bargaining strategy. We show that there is an inherent tension between short- and long term optimizing strategies. What agents learn depends on their current bargaining strategy. Tougher bargainers acquire more and better information. Moreover, differences in information pertain not only to quantity, but also the bias of information gained. In particular we show that those using EU maximizing rules in each bargaining game acquire structurally false information. This undermines max EU's base for success, leading the corresponding agents to fare suboptimally in the long run. The second simulation studies the attitudes towards authoritarian regimes. Here, we model agents that gradually inquire about the overall discontent towards the status quo and hence the prospects of upheaval. As addressing such topics is risky, agents will only address this topic in private conversation and only if they judge disagreement large enough to warrant further inquiry. This again, creates a connection between the contents of agents' beliefs and their actions. We show that this connection opens the door for further unexpected influences, for instance of the agents' mobilities, on long term beliefs in a society. In sum, we argue that many real life cases of temporally extended decision making involve structural connections between the agents' current belief and the quantity and quality of new information acquired. Impacting the agents' long term performance, such connections warrant closer attention from a theoretical and practical perspective.





# Yosuke Hashidate

University of Tokyo

## Dissatisficing-Averse Preferences

(Yosuke Hashidate)

This paper axiomatically characterizes a model of attribute-based inferences in which, to make a choice, a decision maker determines the optimal weight on a given attribute space. To study how the decision maker aggregates attribute-based information of options, this paper takes the framework of preferences over menus, and introduces plausible new axioms for attribute-based inferences. By requiring that the decision maker dislikes increasing the trade-off between attributes, the key axioms characterize a dissatisficing-averse utility (DAU) representation, in which the decision maker determines the optimal weight on the objective attribute space by minimizing the deviation from each (menu-dependent) attribute-best option. Moreover, to study the resulting behaviors, this paper considers a pair of (i) preferences over menus and (ii) choice correspondences, to provide a behavioral foundation for the ex-post choices of DAU. By studying choices from menus explicitly, i.e., considering a relationship between menu-preferences and choices, this paper verifies that DAU allows for the Compromise Effect, which is a well-known preference reversal.

