

EUROPEAN GROUP OF  
**EGPROG**  
PROCESS TRACING STUDIES



# EGPROG

# 2021

May 18-19 & June 1-2



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## Preface

We are honored to welcome you at Tilburg University to the 39<sup>th</sup> Annual Meeting of the European Group of Process Tracing Studies.

Following the long tradition of the meeting, we look forward to presentations and discussions regarding process tracing research in judgment and decision making.

The meeting will be spread out over four days. Each day will start with one keynote speaker, followed by several talks and poster presentations. We are glad to welcome an international audience, and speakers from diverse backgrounds and career levels who will share their current research on process tracing and decision making.

Some say that coffee breaks can turn a good conference into a great conference. While we will not be able to enjoy each other's company in person this year, we will try to summon the unique EGPROC spirit during informal after-session online hangouts.

We hope that you will find the talks to be informative, that you will gain helpful feedback for your current projects, and that you will enjoy meeting your fellow process tracers!

We would also like to thank the student helpers who patiently and busily made sure things would round smoothly in the background: Senna Vromans & Yvo Smetsers. A big thank you for your support!

We look forward to meet all of you at EGPROC 2021!

Your organizers

Rima-Maria Rahal

Christoph Kogler

Marcel Zeelenberg

# Funding



## Location

We would have loved to welcome you at this EGPROC meeting here in Tilburg, in the Netherlands, but due to the ongoing COVID-19 related situation, this year's EGPROC will take place online.

This year's talks will be held on Zoom. Links to the zoom meetings will be provided in the [live conference schedule](#).

Poster sessions and informal hangouts will be held on Wonder. Links to the Wonder meetings will be provided in the [live conference schedule](#). Please note that Wonder is only supported by the browsers Google Chrome and Microsoft Edge.



## Format

Speakers at the EGPROC meeting will share their research ideas, and current projects in the field of process tracking and decision making.

Talks are either short talks (15 minutes incl. discussion) or long talks (30 minutes incl. discussion), facilitated via zoom. Presenters are invited to share their screen to present slides to the audience. Zoom links are in the [live conference schedule](#).

Poster presentations take place via Wonder, where presenters can share their poster via screen sharing. Wonder links, as well as the posters themselves, are in the [live conference schedule](#).

After all formal sessions, we offer attendees the option to join a virtual mixer on Wonder, for informal discussions, additional feedback, and other conversations. The links to join are in the [live conference schedule](#).



# Conference Program

Tuesday, May 18

Time (UCT)	Title	Speaker
4:00 PM	Keynote - Of Nails and Hammers: Measuring Cognitive and Affective Processes in Decision Making	Rima-Maria Rahal
5:00 PM	What I Like Is What I Remember: Memory Modulation in Preferential Choice	Ada Aka
5:30 PM	Dynamics of Counterfactual Retrieval	Feiyi Wang
6:00 PM	Break	
6:15 PM	Testing causal mechanisms with Bayesian process-tracing: Strengthening explanatory power of evaluations case studies?	Johannes Schmitt
6:30 PM	Attentional dynamics in large and complex choice sets	Wenjia Joyce Zhao
7:00 PM	Evaluating the evidence for preference-based attentional capture in binary choice	Blair Shevlin
7:30 PM	Closing	

## Wednesday, May 19

Time (UCT)	Title	Speaker
4:00 PM	Keynote – Web-based information boards growing up: MouselabWEB2.0	Martijn Willemsen
5:00 PM	Eliciting normative tax compliance choices through expected value information: A MouselabWEB study on the deterrence approach	Martin Müller
5:30 PM	The interplay of multiple psychological processes underlying the attraction effect	Neo Poon
6:00 PM	Break	
6:30 PM	Mental reframing in the Asian disease problem. A verbal protocol analysis	Stephan Muehlbacher
6:45 PM	Using Process Tracing and Computational Modeling to Investigate Cognition During Risky Decision Making	Elizabeth Pettit
7:15 PM	Normatively Irrelevant Affective Cues Affect Risk-Taking: Insights from the IGT, Skin Conductance Response, and Heart Rate Variability.	Giulia Priolo
7:45 PM	Closing	
Afterwards	Social Hangout on Wonder	

## Tuesday, June 1

Time (UCT)	Title	Speaker
4:00 PM	Keynote – Burglars in action: Studying offenders on the job using immersive technology	Jean-Louis van Gelder
5:00 PM	Can the eyes tell lies: An eye-tracking study on dishonest behavior	Jan Hausfeld
5:30 PM	Fair Shares and Selective Attention	Dianna Amasino
6:00 PM	Break	
6:15 PM	Sensitivity of numerate individuals to large asymmetry in outcomes, A registered replication of Traczyk et al. (2018)	Supratik Mondal
6:30 PM	Through the Window of My Mind: Mapping Information Integration and the Cognitive Representations Underlying Self-Reported Risk Preference	Florian I. Seitz
7:00 PM	Attention and Salience in Preference Reversals	Alexander Ritschel
7:30 PM	Closing	

## Wednesday, June 2

Time (UCT)	Title	Speaker
4:00 PM	Keynote – What to consider, when making strategic social decisions – An Eye-tracking investigation	Susann Fiedler
5:00 PM	Now you see me – Now you don't: How complexity affects attention and non-attention in choice experiments	Carola Grebitus
5:30 PM	Dynamic interactions between action and attention during exposure to motivational biases	Johannes Algermissen
6:00 PM	Decision Signposts and the guidance of attention	Christoph Ungemach
6:30 PM	The Role of Pavlovian-to-Instrumental Transfer in Intertemporal Choice	Floor Brughoorn
7:00 PM	Poster session on Wonder	
Poster 1	Willful ignorance: A Meta-analysis	Linh Vu
Poster 2	Mouse cursor tracking and cognitive modeling: Exploring parameter measurement	Oliver Grenke
Poster 3	Of mind and motion: The effect of force-feedback perturbation on the processing dynamics in task switching	Judith Herbers
Poster 4	A parallel constraint satisfaction model for intertemporal choice	Peggy Wehner
Poster 5	<u><a href="#">The role of active listening to integrative business negotiations</a></u>	Elisabeth Jäckel
7:30 PM	Closing	

# Abstracts

Tuesday, May 18

May 18 - 4:00 pm

**Rima-Maria Rahal**

Max Planck Institute for Research on Collective Goods; Tilburg University

## **Of Nails and Hammers: Measuring Cognitive and Affective Processes in Decision Making**

It is not easy to predict which choices people will make. Less straightforward, even, is the investigation of how decision makers come to make their choices. Unobtrusive process tracing tools help elucidate the cognitive and affective processes underlying decision behavior. The potential that is harbored in the development of these tools and their exploitation in research questions from different domains is far from exhausted. In this talk, I discuss examples for and work-in-progress mirroring three developments. First, using existing process tracing tools in conjunction opens up intriguing avenues for future research questions. Second, expanding the methodological portfolio to novel tools offers new frontiers in what process tracing can hope to uncover about human decision processes. Third, pushing the areas of application of process tracing methods from the classical decision making paradigms to different contexts widens the scope in which decision processes can be understood.

May 18 - 5:00 pm

Ada Aka

With: Sudeep Bhatia

University of Pennsylvania

### What I Like Is What I Remember: Memory Modulation in Preferential Choice

Memory is a crucial component of everyday decision making, yet little is known about how memory and choice processes interact, and whether or not established memory regularities persist during memory-based decision making. In this paper, we introduce a novel experimental paradigm to study the differences between memory processes at play in standard list recall versus in preferential choice. Using computational memory models, fit to data from two pre-registered experiments, we find that some established memory regularities (primacy, recency, semantic clustering) emerge in preferential choice, whereas others (temporal clustering) are significantly weakened relative to standard list recall. Notably, decision-relevant features, such as item desirability, play a stronger role in guiding retrieval in choice. Our results suggest memory processes differ across preferential choice and standard memory tasks, and that choice modulates memory by differentially activating decision-relevant features such as what we like.

May 18 - 5:30 pm

Feiyi Wang

With: Ada Aka, Sudeep Bhatia

University of Pennsylvania

## Dynamics of Counterfactual Retrieval

People often think about counterfactual possibilities of an experienced reality and imagine how it could have been otherwise. The study of how this occurs is central to many areas of cognitive science, including decision making, social cognition, and causal judgment; however, modeling the memory processes at play in naturalistic counterfactual generation has been difficult. We use established memory models to evaluate and compare multiple mechanisms that could be involved in counterfactual generation. Our models are able to capture nuanced dynamics of retrieval (e.g. how retrieved counterfactuals cue subsequent counterfactuals), and can predict the effects of retrieval on evaluations and decisions. In doing so, we show how existing theories of counterfactual thinking can be combined with quantitative models of memory search to provide new insights about the formation and consequences of counterfactual thought.

May 18 - 6:15 pm

Johannes Schmitt

With: Gunnar Gotz, Magdalena Orth

German Institute for Development Evaluation

## Testing causal mechanisms with Bayesian process-tracing: Strengthening explanatory power of evaluations case studies?

Causal mechanisms take a key role in debates about evaluation methodology. Motivated to strengthen rigour in small-n evaluations, scholars and practitioners intensely debate how to open the black box of causation and increase internal validity. The core of working with causal mechanisms is to systematically analyse interrelations between an intervention and its expected outcomes.

Mechanisms are prominently discussed to improve small-n research, particularly through the method of process tracing. In recent years, social science scholars introduced ways of conducting the method in practice and first applications occur also in the evaluation arena. At a conceptual level, scholars transferred the innovations to the evaluation arena and first applications tap the potential of the Bayesian inspired within-case method. However, practical guidance on how to apply Bayesian process tracing (BPT) in evaluation is limited, particularly on the challenging task of assessing the probative value of evidence and arriving at causal inference.

This article attempts to give a glimpse of how BPT can be applied in evaluation case studies based on experiences made in development evaluation. Building on earlier evidence about the effectiveness of the aid instrument of budget support on reforms in public finance management (PFM), the evaluation asks, among others, whether these effects were sustained after the donors' exit from budget support and whether there is a causal link between ending budget support and the robust reform dynamics in PFM in the four case studies.

May 18 - 6:30 pm

Wenjia Joyce Zhao

With: Armin Thomas; Sudeep Bhatia; Ian Krajbich

The Ohio State University

### Attentional dynamics in large and complex choice sets

Attention is a key determinant of value-based choice. Yet we currently lack a general quantitative framework capable of providing a systematic account of attentional dynamics in large and complex choice sets, such as those encountered by decision makers in everyday choice settings (e.g. when choosing products in a grocery store). We build such a framework and apply it to eye-tracking data from a many-option food choice experiment. Our approach is based on established theories of attention and memory, and describes nuanced aspects of visual search dynamics, i.e., where people look at a given point in time and how this depends on what people have looked at previously. Our model quantitatively predicts key properties of the gaze patterns in the data such as the high probability of sampling neighbors, the frequent sampling and resampling of high-value items, and the delays before returning to an item. Overall, our quantitative, tractable, and general modeling framework provides novel insights regarding visual search dynamics in complex value-based choice. In doing so, it allows for the study of difficult but intriguing research questions regarding the interaction between attention and choice in everyday decisions.

May 18 - 7:00 pm

Blair Shevlin

With: Xiaozhi Yang, Ian Krajbich

The Ohio State University

## Evaluating the evidence for preference-based attentional capture in binary choice

What is the relationship between gaze, value, and the decision process? Some researchers have argued that gaze amplifies value to drive the decision process, while others argue that gaze is drawn to options that are more likely to be chosen. In a recent article, Westbrook et al. (2020, Science) argued for a hybrid two-stage choice process, with an early stage where gaze amplifies information and a late stage where gaze is directed towards the to-be-chosen option. However, their analyses were not sufficient to support this claim because they would identify two stages even in one-stage data. Here, we took a more general approach for detecting whether gaze is drawn to preferred options (Sepulveda et al. 2020, eLife) and applied it to 11 datasets. The datasets that we examined come from binary-choice eye-tracking experiments, some with options broken down into distinct attributes. These include choices from consumer goods, social allocations, risky prospects, and conditioned stimuli. We found that most datasets do not display any correlation between gaze and value. The only datasets that do contain such patterns are those with a small number of repeated options, where subjects may have employed an alternative, search-based choice strategy. Ultimately, our results suggest that goal framing and task structure can impact the relationship between gaze and choice, and that preference-based attentional capture only occurs in certain settings.

Wednesday, May 19

May 19 - 4:00 pm

Martijn Willemsen

TU Eindhoven

### Web-based information boards growing up: MouselabWEB 2.0

MouselabWEB was developed and launched in 2003-04, almost 18 years ago. A simple, open-source online information board and questionnaire tool that was created in the advent of online research. Before online experiments and MTurk became mainstream tools for researchers, it already allowed us to reach large samples of non-student users doing a process tracing study, often dialing up via a slow 56kbit modem! In this talk I will briefly sketch the history of MouselabWEB 1.0, starting from the first process-tracing based Asian Disease replication we ran in the summer of 2004. I will discuss the important insights process tracing data can deliver us to test (computational and Heuristic) models of decision behavior and how we can use tools like mouselabWEB to influence the fluency of the comparison process as a 'causal' test of underlying processes. I will conclude my talk with discussing some of the new features of MouselabWEB 2.0 that allow for cognitive manipulations such as the fluency of comparisons (using animated delayed openings), blurred boxes providing more realistic user experiences closer to real displays and the integration of web-browser based eye-tracking in mouselabWEB.

**May 19 - 5:00 pm**

**Martin Müller**

**With: Christoph Kogler, Jerome Olsen, Erich Kirchler**

**University of Vienna**

### **Eliciting normative tax compliance choices through expected value information: A MouselabWEB study on the deterrence approach**

Although process tracing tools have been shown to provide important insights into the cognitive processes underlying decisions under uncertainty, they have been largely neglected in tax compliance research so far. In two MouselabWEB studies, we tested whether tax decisions are influenced by expected value considerations based on income, tax rate, audit probability, and fine level, as proposed by the most influential deterrence-based tax compliance models. Manipulating whether an explanation of expected value was provided combined with explicit numerical expected value information for each decision, we did not observe more model-conform choices in both studies. Only when the expected value was presented as a more accessible visual cue in Study 2, participants made more model-conform choices. We conclude that individuals fail to properly integrate provided information and choices and decision processes are most affected by deterrence information in isolation.

May 19 - 5:30 pm

Neo Poon

With: Ashley Luckman, Andrea Isoni, Tim Mullett

Warwick Business School

## The interplay of multiple psychological processes underlying the attraction effect

The attraction effect refers to the observation that an option can be promoted as a target when an asymmetrically dominated decoy option is added to the choice set (Huber et al., 1982; Simonson, 1989). This effect is one of the most studied phenomena in psychology and has drawn considerable attention (Frederick et al., 2014; Huber et al., 2014), while many mathematical models were created to explain it (Bhatia, 2013; Noguchi & Stewart, 2018; Roe et al., 2001; Trueblood et al., 2014; Usher & McClelland, 2004). However, research which directly investigates the cognitive mechanisms underlying the effect with process-tracing methods remain uncommon, except a handful of eye-tracking studies (Król & Król, 2019; Marini et al., 2020; Noguchi & Stewart, 2014).

This work is the first to examine the attraction effect with multiple process-tracing methods, namely mouse-tracking and reason listing. Theoretically, the present work allows us to study how mental processes of both high (e.g. decision strategies) and low (e.g. attribute sampling, attentional patterns) cognitive levels integrate to produce the attraction effect, as well as testing the assumptions of existing cognitive models. Methodologically, the novel data obtained in this experiment provides triangulation on process-tracing methods and improves validity of the analyses (Holmqvist et al., 2011).

After replicating the attraction effect, we first found that the quantity and position of reasons, as well as fixation patterns, could predict choice independently. We further found that reasoning partially mediated the effects of attentional processes on choice, while micro-level analyses showed that fixation could predict the types of reasons generated by participants. These results demonstrated the intertwined roles of attentional processes and reasoning in multialternative choices, and provided the first step towards a complex cognitive model.

May 19 - 6:30 pm

Stephan Muehlbacher

With: Kühberger, A., & Kirchler, E.

Karl Landsteiner University of Health Sciences

### Mental reframing in the Asian disease problem. A verbal protocol analysis

The Asian disease problem (Tversky & Kahneman, 1981) is the most prominent example to demonstrate framing effects in risky choice. In line with prospect theory, describing the scenario in terms of gains results in more risk averse choices than describing the same outcomes in terms of losses. However, typically about a quarter of participants is not affected by the decision frame. Maule (1989) raised the hypothesis that these participants mentally re-frame the problem, i.e., they recognize that if part of the population dies due to the disease this also means that the other part would survive. By means of a verbal protocol analysis Maule supports his idea of mental reframing, though his sample size with  $N = 12$  is of questionable statistical power. We replicated his study in two larger samples which allowed for more thorough analyses. In a pilot study ( $N = 55$ ) we found that participants whose choices are not in line with prospect theory's predictions take more time until they make their decisions. Their verbal protocols exhibit statements indicating a re-framing of the decision problem. An analysis of the number of gain-related vs. loss-related thoughts as captured by the protocols shows that such mental re-framing mainly occurs under positive framing and is less likely under negative framing. In the main study ( $N = 162$ ) we obtained the same results, except for the effects regarding decision times. In this study, participants taking the risky option took longer than those choosing the safe option, regardless of the framing.

May 19 - 6:45 pm

Elizabeth Pettit

Miami University

## Using Process Tracing and Computational Modeling to Investigate Cognition During Risky Decision Making

Computational models have been proposed with parameters that represent abstract cognitive processes involved in risky choice and how those processes work together to explain individual differences in decision making. However, few experiments have explored the relationship between parameters from these models and process tracing methodologies that capture physical manifestations of invisible mental processes. This project aims to address that gap by fitting cognitive models to participants' choice sequence during the Iowa Gambling Task (IGT). A novel application of k-means clustering is applied to participants' cursor trajectories, or hand movements, to determine three distinct path shapes, or typologies. Analyses revealed that the proportion of trajectory typology changed as the experiment progressed and participants began to learn deck pay-outs. After the first 20 trials, participants more frequently moved the cursor directly to their deck of choice as opposed to exploring other decks in the choice space. For risky choices, there were significant relationships between individual differences in parameter values and trajectory paths that displayed heavy exploration of all decks in the choice space and exploration of adjacent decks. This research provided a first step in relating model parameters and process tracing data to determine whether physical manifestations of cognitive processes involved during the IGT map onto corresponding model parameters.

May 19 - 7:15 pm

Giulia Priolo

With: Marco D'Alessandro, Andrea Bizzego, Nicolao Bonini

University of Trento

### **Normatively Irrelevant Affective Cues Affect Risk-Taking: Insights from the IGT, Skin Conductance Response, and Heart Rate Variability.**

Being able to distinguish between safe and risky options is paramount in making functional choices. However, deliberative manipulation of decision-makers emotions can lead to risky behaviors. In this study we investigated how affective reactions driven by normatively irrelevant affective cues interfere with risk-taking. Iowa Gambling Task's Good and Bad decks have been made unpleasant through a negative auditory manipulation. Anticipatory skin conductance response (aSCR) and Heart Rate (HR) have been investigated in line with the Somatic Marker Hypothesis. Results showed fewer selections from Good decks when they were negatively manipulated (Incongruent condition). No effect of the manipulation was detected when Bad decks were negatively manipulated (Congruent condition). Higher aSCR was associated with Bad decks in Congruent condition. Slower HR was found before selections from Good decks in Control and Congruent condition and from Bad decks in Incongruent condition. Differences in HR between Bad and Good decks were also detected in Congruent condition.

Tuesday, June 1

June 1 - 4:00 pm

Jean-Louis van Gelder

Max Planck Institute for the Study of Crime, Security and Law

### **Burglars in action: Studying offenders on the job using immersive technology**

By virtue of its illegal nature, crime generally tends to occur out of sight. This significantly complicates its empirical study, and generally observational or experimental methods are not feasible for both ethical and practical reasons. Consequently, our knowledge of criminal offenses such as burglary relies in large part either on studies examining targeting patterns and target characteristics, or on retrospective methods, such as interviews and surveys. The former type of research has yielded crucial insights on target selection and offending trajectories taken but offers little in the way of burglar decision-making processes. Interviews and surveys, conversely, remedy these limitations to some extent but have their own shortcomings relating to their reliance on retrospection and self-disclosure. In this presentation, I will discuss research from the Virtual Burglary Project that takes virtual reality inside prisons to examine how burglars operate 'on the job'. By mimicking criminogenic settings in VR while maintaining experimental control, VR allows for the study of the burglary event as it unfolds. VR allows for the (near) real-time tracking of different types of relevant behavior, including gaze, physiological measures, spatial patterns, and target selection, while also being compatible with think-aloud and interview protocols. I will discuss how this immersive approach can contribute to a better understanding of burglar decision making, in terms of both the burglary and the scouting process, and how it can be used to assess the effectiveness of interventions aiming to reduce burglary.

June 1 - 5:00 pm

Jan Hausfeld

With: Urs Fischbacher

University of Amsterdam

### Can the eyes tell lies: An eye-tracking study on dishonest behavior

In social as well as economic interactions, the assessment of whether another person is lying or not is a key factor when making a decision. We conducted a laboratory study with eye-trackers to investigate how the verifiability of a lie and the respective payoff structure affect both behavior and processing. We find that whether a lie can be detected or not affects the share of people behaving dishonestly, i.e. more people gain higher rewards if a lie cannot be detected. The processing data can distinguish between dishonest and honest choices, and these patterns are not affected the verifiability of a lie. We further explore the power of simple gaze measures: Simple gaze measures can i) reveal deceptive tendencies, ii) predict the underlying incentive structure, and iii) classify deceptive subgroups using only few situations, even in situations where choices are uninformative. Importantly, these gaze measures outperform choices. Last, we vary the positioning of the information which one can lie about and the corresponding payoff. This manipulation has substantial effects: If the payoffs are presented in the top part of the screen, more first fixations are on these payoffs, which, in turn, is associated with more dishonest reports.

June 1 - 5:30 pm

Dianna Amasino

With: Davide Pace, Joël van der Weele

University of Amsterdam

## Fair Shares and Selective Attention

Fairness views vary from equal splits to libertarian divisions and often serve to justify economic privilege. Prior research has found evidence for self-serving biases in fairness views and attitudes toward redistribution. We investigate the role of visual attention in such self-serving biases. We explore whether a random advantage in pay rate influences information-seeking of merit (task performance) vs. outcome (pay rate x task performance) information where outcome information supports the lucky high-pay participants keeping more for themselves and merit does not. Further, we examine the impact of manipulating attention on allocations. Participants (N=600) and recipients (N=900) completed real-effort tasks before being assigned a high (Advantaged) or low (Disadvantaged) pay rate per correct answer. They were then paired with opposite pay-rate recipients and divided their jointly-produced earnings. Before allocation decisions, participants could reveal merit and outcome information in MouselabWeb, with time limits on one type of information imposed on some participants (Willemsen & Johnson, 2011). Compared to Disadvantaged participants, Advantaged participants allocated more of the joint earnings to themselves, controlling for effort and demographics. With freely-directed attention, Advantaged participants paid less attention to merit and focused more on outcome information. Moreover, shifting attention had a causal effect on allocations: restricting outcome information pushed participants to look more at merit and give less of the surplus to the Advantaged members than restricting merit information. These findings indicate that participants naturally look more at information that benefits them, and exogenously shifting attention has a small, but significant causal impact on allocations.

June 1 - 6:15 pm

Supratik Mondal

With: Jakub Traczyk, Ph.D.

SWPS University of Social Sciences and Humanities

### Sensitivity of numerate individuals to large asymmetry in outcomes, A registered replication of Traczyk et al. (2018)

Our main aim is to replicate the effect shown by Traczyk et al.(2018), where individuals with higher statistical numeracy, compared to individuals with lower statistical numeracy, strategically employed a more effortful choice strategy when outcomes were meaningful. We hypothesize that when payoff difference between two gambles is substantial, highly numerate participants more likely to choose gambles that maximize Expected Value (EV); otherwise, they are less likely to go for an energy-intensive EV maximization strategy. Data were collected from 73 participants using the Prolific platform. The sample size was determined by simulation using the data collected in the original study. Participants answered, randomly presented, twelve high and twelve low payoff choices in binary two-outcome gambles framed as gains. Additionally, we measured participant's cognitive ability, objective and subjective numeracy using International Cognitive Ability Resource (ICAR), Berlin Numeracy Test (BNT), and Subjective Numeracy Scale (SNS), respectively. Results showed that each participant maximized EV when the difference between two-outcome was high, although participants with high BNT scores followed EV maximization strategy significantly more times compare to individuals with low BNT scores. However, when the payoff difference between two gambles was minimal, highly numerate participants less often maximized EV compared to participants with low BNT scores. This result demonstrates statistically numerate individual's ability to adapt and modulate their strategy based on changes in the environment. This modulation in strategy is much more distinct for individuals with high BNT scores than individuals with low BNT scores exhibiting numerate individual's discernible sensitivity towards large asymmetry in outcomes.

June 1 - 6:30 pm

Florian I. Seitz

With: Markus D. Steiner, Renato Frey

Center for Cognitive and Decision Sciences, University of Basel

## Through the Window of My Mind: Mapping Information Integration and the Cognitive Representations Underlying Self-Reported Risk Preference

A person's risk preference may determine significant life outcomes (e.g., in finance or health), and people are therefore routinely asked to report their risk preferences in various scientific and applied contexts. Yet, still little is known concerning the cognitive underpinnings of this judgment-formation process. We ran two studies (N = 250, and N = 150 in a retest) implementing the process-tracing method of aspect listing, to investigate the information-integration processes underlying people's self-reports by means of cognitive modeling (RQ1), as well as to examine people's cognitive representations of their risk preferences (RQ2). Our analyses indicate that interindividual differences in self-reported risk preferences can be modeled well based on the listed aspects' properties of evidence and substantially better than using sociodemographic variables as predictors. Specifically, to render self-reports people appear to integrate the strength of evidence of multiple aspects sampled from memory. These aspects further revealed that people's cognitive representation of their risk preferences mostly relate to the magnitudes of outcomes and often to explicit trade-offs between positive and negative outcomes, in line with a risk-return perspective. Crucially, within participants the strength of evidence of the listed aspects remained highly stable across the two studies (RQ3), and changes therein were closely related to changes in self-reported risk preference (RQ4). In sum, our findings provide insight into the cognitive processes of how people render self-reports of their risk preferences, suggest an explanation for the well-documented temporal stability thereof, and thus corroborate the internal validity of this measurement approach.

June 1 - 7:00 pm

Alexander Ritschel

With: Carlos Alós-Ferrer

University of Zurich

### Attention and Saliency in Preference Reversals

We investigate the implications of Saliency Theory for the classical preference reversal phenomenon, where monetary valuations contradict risky choices. It has been stated that one factor behind reversals is that monetary valuations of lotteries are inflated when elicited in isolation, and that they should be reduced if an alternative lottery is present and draws attention. We conducted two preregistered experiments, an online choice study (N=256) and an eye-tracking study (N=64), in which we investigated saliency and attention in preference reversals, manipulating saliency through the presence or absence of an alternative lottery during evaluations. We find that the alternative lottery draws attention, and that fixations on that lottery influence the evaluation of the target lottery as predicted by Saliency Theory. The effect, however, is of a modest magnitude and fails to translate into an effect on preference reversal rates in either experiment. We also use transitions (eye movements) across outcomes of different lotteries to study attention on the states of the world underlying Saliency Theory, but we find no evidence that larger saliency results in more transitions.

Wednesday, June 2

June 2 - 4:00 pm

Susann Fiedler

Vienna University of Economics and Business

### What to consider, when making strategic social decisions? An Eye-tracking investigation

In many societal problems, individuals exhibit a conflict between keeping resources (e.g., money, time or attention) to themselves or sharing them with another individual or group. The reasons motivating decisions in favor of others welfare can thereby vary from purely altruistic to completely strategic. Be it the stranger making an effort returning a lost valet to its rightful owner or a co-worker pitching in her fair share in a joint project. Actions like that create an environment that makes living together a pleasant experience. Hence, understanding how decisions determining the welfare of oneself and others are made is important for facilitating this behavior by building institutions that maximize the rate of cooperation in a society. To shed new light on such decision making processes I will present recent evidence from a set of process tracing experiments utilizing eye-tracking and economic games. Experiments will focus on the role of social preferences in the choice construction process and will identify mechanisms (i.e., search and processing depth, information weighting, and ignorance) through which they guide choice behavior. I will in particular focus on the differences and commonalities between strategic and altruistic decisions. Specifically, investigating to which extent people direct attention towards certain components of the decision situation in a context-dependent manner.

June 2 - 5:00 pm

Carola Grebitus

With: Jutta Roosen

Arizona State University

### Now you see me – Now you don't: How complexity affects attention and non-attention in choice experiments

Consumers make countless choices every day. The more options and information available, the more complex the decision. This can lead them to switch from compensatory decision-making to heuristics where decision errors are more likely to occur. Our study combines discrete choice experiments (DCEs) with eye tracking to measure how much attention is paid to information in the DCE and how much information is ignored (non-attention). We vary the DCE's complexity by presenting different amounts of products to choose from. Since we are tracking eye movements, we can analyze the use of decision strategies when making choices that differ in complexity. The objective is to shed light on how complexity in decision making drives use of compensatory decision-strategies and heuristics. We collected our data in 2017. In particular, complexity is tested by varying the number of products presented. The experiment includes two treatments. In treatment 1 two product alternatives are presented in the choice sets, and in treatment 2 four product alternatives are displayed. Eye tracking measures fixations where information is processed. The eye movement is tracked during choice making. We measure the use of decision strategies by investigating attention and non-attention using fixation count. Use of heuristics is defined by non-attention, i.e., selective use of information. Data are analyzed using random parameter logit models focusing on eye fixations. Preliminary results indicate that fixation count by alternative significantly affects choice for both, the two-product and four-product design. This suggests that the amount of attention paid to product alternatives affects choice.

June 2 - 5:30 pm

Johannes Algermissen

With: Hanneke E.M. den Ouden

Donders Institute for Brain, Cognition, and Behaviour, Radboud University Nijmegen

### Dynamic interactions between action and attention during exposure to motivational biases

Motivation can bias behavior: Reward prospect drives people towards action invigoration, while punishment prospect suppresses action. Research on such motivational biases has primarily focused on their 'hardwired' automatic nature and their putative maladaptive consequences. We asked whether humans can adaptively recruit these biases in situations in which they could help select the right response. In an eye-tracking study (N = 35), participants learned whether to perform Go or NoGo actions to various cues. Action planning and execution were separated by a phase in which potential rewards and punishments for correct/incorrect responses were presented in a gaze-contingent manner. We observed that learned values of making a Go/NoGo action biased attention towards rewards/punishments, respectively. These findings indicate that action plans can prime attention towards valenced information. Vice versa, an attentional reinforcement-learning drift-diffusion model (RL-DDM) revealed that both the size of rewards and punishments as well as how long participants looked at them predicted the final (Go/NoGo) response. These results suggest that humans might adaptively recruit motivational biases to ensure the translation of intentions into actions.

June 2 - 6:15 pm

Christoph Ungemach

With: Balachandar Kaliappan

TUM School of Management

### Decision Signposts and the guidance of attention

Decision signpost offer a choice architecture tool with the ability to align choice behaviors with matching goals and improve consumer welfare (Ungemach et al. 2018). To understand how decision signposts modulate choice behavior through the guidance of attention, we conducted an eye-tracking study (n = 60) employing a 2 (signpost: present vs. absent) x (9 choices) mixed design in which participants had to choose between pairs of cars that differed with regard to their price and environmental impact. We replicated the ability of the decision signpost to increase the likelihood of choosing the environmental option. Importantly, we also observe that participants in the decision signpost condition require fewer fixations to make a choice. This effect of condition on the number of fixations was moderated by the strength of matching environmental attitudes. Participants with stronger environmental attitudes required fewer fixations in the signpost condition, while similar fixation counts were observed across environmental attitudes in the condition without a decision signpost. A similar interaction was observed for the ratio of fixations on the environmental vs. non-environmental option. Participants with higher NEPr scores in the signpost condition showed higher ratios of fixations on the environmental versus non-environmental option. Taken together, the results show how the alignment of choice behaviors with matching goals through the presentation of decision signposts is reflected in the observed information search and attention patterns. Decision signposts facilitate choices by increasing the focus on the option most aligned with personal goals, resulting in more environmental choices with fewer fixations.

June 2 - 6:45 pm

Floor Burghoorn

With: Vivian Heuvelmans, Anouk Scheres, Karin Roelofs, Bernd Figner

Behavioural Science Institute, Radboud University Nijmegen

## The Role of Pavlovian-to-Instrumental Transfer in Intertemporal Choice

People are often willing to forego an increase in the magnitude of a reward to obtain the reward sooner, which has been implicated in various maladaptive behaviours. However, the psychological processes driving this temporal impulsivity remain unclear, despite such knowledge being crucial for understanding and intervening in such maladaptive behaviours. We aimed to bridge this gap by testing the hypothesis that impulsive intertemporal decisions arise through Pavlovian-to-Instrumental Transfer (PIT), following a previously proposed model and research demonstrating the role of PIT in addiction. This intertemporal PIT hypothesis holds that cues predicting immediate gratification (e.g., a fast-food sign) trigger an approach response towards the immediate reward (a snack), interfering with inhibitory behaviour serving long-term goals (dieting behaviour). We developed a paradigm in which participants learned the associations between cues and rewards varying in their amount and delay. We then tested whether these associations exerted transfer effects by biasing approach/avoidance behaviour in an instrumental choice task. Across 2 experiments, we observed that Pavlovian cues predicting large (versus smaller) and immediate (versus delayed) rewards were evaluated more positively, reflecting the acquisition of Pavlovian cue-outcome associations. We also found evidence for the hypothesized transfer effect of the reward amount on instrumental behaviour, as large (versus smaller) cues increased instrumental approach. However, no transfer effects were found for reward delay, contrary to the proposed role of PIT in impulsive intertemporal choice. Our research suggests for future studies to adopt intertemporal instrumental rewards, and to investigate the moderating effect of instrumental task performance on transfer effects.

June 2 - 7:15 pm  
Poster session on Wonder

### Poster 1

Linh Vu

With: Margarita Leib, Ivan Soraperra, Joël van der Weele, Shaul Shalvi  
University of Amsterdam

### Willful ignorance: a Meta-analysis

Research endeavors in the last two decades have highlighted that decision making is prone to willful ignorance. While deliberate avoidance is beneficial to the decision maker to maximize self-interest, this behavior can induce adverse externalities to others, from another individual in the small scale of a social interaction, to the labor force in the large scale of a consumer market. To obtain a comprehensive understanding of this topic, we present the first meta-analysis on willful ignorance. The aggregated results from 29 papers (N = 8916) indicate that when given the chance, a substantial amount of subjects avoid information. Without information, subjects are almost twice as likely to make a selfish choice than with information. This lead to a significant reduction in the wellbeing of other affected party. Using a multiple meta-regression, we found that such ignorance is mitigated by the potential harm for others after controlling for other factors. Most notably, our study highlights the need for interventions that promote thoughtful and sustainable decision making.

## Poster 2

Oliver Grenke

With: Martin Schoemann, Stefan Scherbaum

TU Dresden

### Mouse cursor tracking and cognitive modelling: Exploring parameter measurement.

Mouse cursor tracking offers a possibility to uncover the dynamics of decision processes. We present an experiment designed to explore how much information can be extracted from mouse cursor trajectories in the context of an established model of decision making. We aim to measure, rather than estimate, the four standard parameters of the diffusion model, namely: non-decision time, starting bias, drift rate, and threshold. We implemented mouse cursor tracking in a random dot motion task, which allowed for control and traceability of the evidence presented to the participant at any given point in the experiment. Additionally, by coupling dot motion with mouse cursor movement, participants only received information on movement direction while moving the computer mouse. In the analysis, we consider different approaches for extracting the model parameters from mouse movement data. Finally, we test the validity of our measures by comparing the actual RT distribution and distributions generated from estimated, as well as measured DDM-parameters.

### Poster 3

Judith Herbers

With: Caroline Surrey, Stefan Scherbaum

TU Dresden

## Of mind and motion: The effect of force-feedback perturbation on the processing dynamics in task switching

Goal oriented behavior comprises the ability to maintain a goal in the face of distraction, but also to switch goals when it is appropriate. This balance between staying and switching has often been studied with task switching paradigms. However, these paradigms usually focus on outcome-based measures as task choice and increased response time resulting from a switch, hence risk ignoring the dynamics of the underlying system. To investigate more directly how the dynamics of the underlying system are affected by environmental influences, we developed a voluntary task switching paradigm using a double registration procedure: Participants indicated their task choices using a joystick and then performed the chosen task with the joystick. We applied brief force-feedback perturbations of the joystick during the task choice process in favor of a task repetition or switch and continuously recorded motion data during the task-choice and the task-response process. We found that switch costs were evident in both error rates and response times. In contrast to typical voluntary task switching paradigms, we did not find a repetition bias. As expected, force-feedback perturbations in favor of a task repetition or a task switch resulted in an increase or decrease in task repetition rates, respectively. Furthermore, we explored the process-tracing data in different analyses. Overall, the results suggest that environmental influences as forced-feedback perturbations can indeed influence the task choice process and the novel paradigm seems prosperous for future investigations on larger samples.

## Poster 4

Peggy Wehner

With: Martin Schoeman, Marc Jekel, Stefan Scherbaum

TU Dresden

### A parallel constraint satisfaction model for intertemporal choice

Intertemporal decision-making is ubiquitous in everyday life, and has hence been subject to a long stream of research in the economic and psychological science. The original normative perspective on intertemporal choice has been challenged by a vast body of research that showed a large quantity of empirical phenomena – hence also called anomalies. In an attempt to integrate them, each newly found empirical particularity has led to the introduction of new models. The result is a large and sometimes confusing amount of intertemporal choice models. Recent efforts in presenting a unified theory of intertemporal decision-making highlight the importance of a more psychological perspective (incorporating known phenomena in human information processing). Later attempts followed this approach by developing models that also aim to describe process measures such as decision time. We present a novel psychologically plausible parallel constraint satisfaction model for intertemporal decision-making. We investigated the model's behaviour with a particular focus on the occurrence of the known anomalies and derived explanations for the origin of intertemporal decisions and its particularities. We also confirmed the reliability of the model by using a parameter recovery study and determined its predictive accuracy. Our results show that the model accounts for temporal discounting similarly well as established models, produces all known anomalies, and predicts novel effects on the decision dynamics, and thus is a promising new approach of modelling intertemporal decision-making.

## Poster 5

Elisabeth Jäckel

With: Alfred Zerres, Joachim Hüffmeier

University of Amsterdam

### The role of active listening in integrative business negotiations

Active listening is a promising conversation technique in negotiations because it should be helpful to better understand the other party and thereby facilitate the realization of joint gains. However, negotiation research has never empirically investigated its effect in the context of integrative business negotiations. In the present research, we studied the role of active listening following an offer that comprises more than one issue in videotaped and coded integrative negotiations. Preliminary results of 24 negotiations demonstrate with lag sequential analysis that multi-issue activity-active listening patterns occurred above chance level. These patterns in turn triggered (more) integrative statements (i.e., multi-issue activity) and inhibited distributive statements (i.e., positional information provision and substantiation). Moreover, multi-issue activity-active listening patterns (and not active listening alone) positively related to the joint economic outcomes of the negotiation at the dyad level. These findings provide first insights into the beneficial effects of active listening in the context of integrative business negotiations.

# Participants

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