

PROGRAM

EGPROC Meeting 2016

35th Annual Meeting of the European
Group of Process Tracing Studies

23 June – 25 June 2016

Max Planck Institute for Research on Collective Goods

Bonn, Germany



Table of Contents

Preface	4
Venue.....	5
Format.....	6
Conference Program	7
Abstracts	11
Participants	30
Getting around in Bonn.....	32
Impressum	36

PREFACE

Welcome to the 35th EGPROC Meeting 2016 at the Max Planck Institute for Research on Collective Goods in Bonn.

The European Group of Process Tracing Studies meeting has a tradition as the annual gathering of researchers interested in process tracing research in the area of Judgment and Decision Making.

With four outstanding keynote speakers and discussants for the pre-meeting symposium, and 30 talks scheduled in the intense workshop, this year's EGPROC meeting is an event we have been eagerly looking forward to.

The symposium brings together experienced process tracing researchers working mainly in the field of JDM to discuss current developments of process models. The symposium is aimed at finding common ground for different sets of models, discussing ideas for developing existing models further and integrating them into a bigger framework of process models. The second integral part of this year's meeting is a 2-day intensive workshop in which the participants will have the chance to present their research and receive feedback on their own work.

We hope you will enjoy the meeting, experience the talks as informative, and engage in lively discussions along the way.

Susann Fiedler, Andreas Glöckner, Minou Ghaffari, & Rima-Maria Rahal

VENUE

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How to get to the MPI

By Taxi

A taxi ride to the MPI from the center of Bonn costs about 12 €. From Cologne/ Bonn airport, the cost is about 35 €. The central telephone number for taxis is (02 28) 55 55 55.

Public transport

From the **central station**, take bus 610 or 611 in the direction of Bad Godesberg-Rheinallee. Get off at Deutsche Welle. The institute is located opposite the Deutsche Welle. This trip takes about ten minutes. An alternative is to take the tram (U-Bahn). Take U-Bahn 66 toward Ramersdorf/Bad Honnef or U-Bahn 16, 63 or 67 toward Bad Godesberg. Exit at Heussallee/Museumsmeile. Walk along Heussallee, following the signs for Deutsche Welle. At Kurt-Schumacher-Str., turn right. The institute is on the right-hand side of the street, approximately 100 m from the corner. This takes around 20 minutes. A single ticket for this journey is €2.80.

From **Cologne/Bonn airport**, take shuttle bus SB 60 (runs every 30 min.) to Bonn Hauptbahnhof. Once in Bonn, change to bus line 610 or 611, following the above directions. The airport bus stop is located between Terminals 1 and 2, and the journey time is just over half an hour. There is no need to book in advance, and tickets can be bought from the bus driver for €8.00.

FORMAT

Participants at the meeting will present and discuss recent research and ideas in an open and relatively informal atmosphere.

Presenters in the workshop are reminded that they have been scheduled for standard presentations (10 min talk + 10 min discussion) or extended presentations (15 min talk + 15 min discussion).

The last presenter in each session will **chair** the session. For the keeping of the time of the last talk in each session, the first presenter will take over.

A laptop with ppt and PDF will be available, but also the use of your own Laptop will be possible.

CONFERENCE PROGRAM

Thursday, 23 rd of June	
Symposium	
11:30	Welcome Reception
12:00	Keynote: Process Models in JDM Ian Krajbich
13:30	Lunch Break
14:30	Panel Discussion Carlos Alós Ferrer, Andreas Glöckner, Marc Jekel, Michael Birnbaum & others
16:30	Coffee Break
Session 1 – Drift Diffusion Models	
17:00	Implications of Visual Attention Phenomena for Models of Preferential Choice Timothy Mullett (15 min)
17:30	Simple Economic Choice in Large Choice Sets: An Investigation of Hick's Law Armin Thomas (10 min)
17:50	Salient nutrition labels increase the integration of health attributes in goal-directed food decisions Laura Enax (10 min)
18:10	Thinking while doing: The influence of ongoing evaluation on choice Avril Hand (10 min)
18:30	Drinks & Dinner at the Institute

Friday, 24 th of June	
Session 2 – Top-Down/Bottom-Up Processes	
09:00	The power of attention: Using eye gaze to bias social preference choices Minou Ghaffari (15 min)
09:30	Target location probability influences eye movements and decision-making Nina Chrobot (15 min)
10:00	Eye movement behind information processing in cross-modal anchoring Pawel Tomczak (10 min)
10:20	Query Theory and the Incumbency Effect: Salient Information is Queried Earlier Anna Katharina Späti (10 min)
10:40	Coffee Break
Session 3 – Methods	
11:10	Mousetrap: Free, open-source, and cross-platform mouse-tracking and analysis plug-ins Felix Henninger (15 min)
11:40	Measuring the (dis-)continuous mind Dirk U. Wulff (15 min)
12:10	Interaction of eye and hand in perceptual decision making Arkady Zgonnikov (15 min)
12:40	Fixation sequences as an indicator of decision strategy: An investigation of some properties of the Needleman-Wunsch algorithm Frank Renkewitz (10 min)
13:00	Lunch Break

Session 4 – Decision Strategies

14:00	Poor Optimizers, Worse Satisficers	Jacob L. Orquin (15 min)
14:30	The halo effect: cognitive bias or statistical learning in disguise?	Sonja Perkovic (15 min)
15:00	Tracing Intuition and Deliberation in Risky Decision Making for Oneself and Other	Kinga Posadzy (10 min)
15:20	Coffee Break	
Session 5 – Risky Choice		
15:40	On the relationship between visual attention biases and loss aversion	Nathaniel J. S. Ashby (10 min)
16:00	You win some, you lose some: Tracking Emotions in Risky Gambles	Michael Schulte-Mecklenbeck (10 min)
16:20	The role of eye movements in contextual risky choice	Felix Molter (15 min)
16:40	Coffee Break	
Session 6 – Intertemporal Choice		
17:00	Comparing the underlying process between intertemporal choice & risky choice	Lei Zhou (10 min)
17:20	Hand and eye movement during intertemporal choice	Denis O'Hora (10 min)
17:40	Distinguishing Comparison Strategies in Intertemporal Decision Making	Martin Schoemann (10 min)
19:00	Dinner at “El Español” Bornheimer Str. 76 (Haltestelle Stadthaus)	

Saturday, 25 th of June		
Session 7 – Inter-individual Differences		
09:00	Assessing individual decision thresholds with KETO	Daniel Hausmann (15 min)
09:30	The Price of Fear: Developing a behavioural assessment of fear-related avoidance incorporating dynamic response measures	Santiago Garcia-Guerrero (15 min)
10:00	Differences in cognitive representation of probability as a function of numeracy	Kamil Fulawka (15 min)
10:30	Coffee Break	
Session 8 – Social Dilemma I		
11:00	Processes of Construal & Depth of Processing: Does The Interaction Explain “Contextual Framing Effects”?	Ozan Isler (10 min)
11:20	Use Your Brains! Effects of Analytical Thinking on Strategic Sophistication	David Dohmen (10 min)
11:40	Testing the level of consistency between choices and beliefs in games using eye-tracking	Luca Polonio (10 min)
12:00	Lunch Break	

Session 9 – Social Dilemma II	
13:00	What drives the (un)empathic bystander to intervene? Eye-tracking recordings of third-party decision making Yang Hu (10 min)
13:20	Response time and click position: Cheap indicators of preference Fadong Chen (15 min)
13:50	Blind to Groups: Understanding Group Membership Consideration in Visual Information Search in Intergroup Dilemmas Rima-Maria Rahal (10 min)
14:10	Grabbing Coffee
14:20	Final Discussion (planning next year)
15:00	End

ABSTRACTS

Session 1 – Drift Diffusion Models

Session 1, Thursday, 17:00

Implications of Visual Attention Phenomena for Models of Preferential Choice

Timothy Mullett (with Neil Stewart)

University of Warwick

We use computational modelling to examine the ability of evidence accumulation models to produce the reaction time distributions and attentional biases found in behavioural and eye-tracking research. We focus upon simulating reaction times and attention in binary choice with particular emphasis upon whether different models can predict the late onset bias (LOB), commonly found in eye movements during choice (sometimes called the gaze cascade). The first finding is that this bias is predicted by models even when attention is entirely random and independent of the choice process. This shows that the LOB is not evidence of a feedback loop between evidence accumulation and attention. Second, we examine models with a relative evidence decision rule and an absolute evidence rule. In the relative models a decision is made once the difference in evidence accumulated for two items reaches a threshold. In the absolute models, a decision is made once one item accumulates a certain amount of evidence, independently of how much is accumulated for a competitor. Our core result is simple – the existence of the late onset gaze bias to the option ultimately chosen, together with a positively skewed reaction time distribution means that the stopping rule must be relative not absolute. A large scale grid search of parameter space shows that absolute threshold models struggle to predict these phenomena even when incorporating evidence decay and assumptions of either mutual inhibition or feed forward inhibition.

Session 1, Thursday, 17:30

Simple Economic Choice in Large Choice Sets: An Investigation of Hick's Law

Armin Thomas (with Ian Krajbich)

Technische Universität Berlin

We often have to choose from a large number of options (e.g. choosing a yogurt at the supermarket). Hick's Law predicts that decision time should linearly increase with the logarithm of the number of options, when we make these kinds of choices. However, this has yet to be tested in economic choice. Moreover, the neural mechanisms underlying this response time phenomenon remain unknown. We explore these questions using an eye-tracking experiment in which hungry subjects choose snack food items from large choice sets of varying size (N : 9-36).

51 hungry individuals participated in this experiment, which consisted of choice and rating tasks. During the choice task, subjects faced 200 randomly assembled sets of snack food items (sizes: 9, 16, 25, 36). For each set, subjects were asked to choose the item that they would like to eat most at the end of the experiment. Subjects had as much time as they wanted to make their choice. In the second task, subjects rated each of the 80 food items, which provided independent measures of their values.

We find that subjects' response times do increase as a logarithmic function of choice set size, while response accuracy remains constant and high, consistent with Hick's Law. In order to shed more light on these findings, we use the choice, response-time, fixation and value data to compare several computational models of the choice process in this class of environments. The results of this comparison show that the attentional drift-diffusion model qualitatively matches subjects' choice and response-time behavior and outperforms the alternative models on several important dimensions.

Session 1, Thursday, 17:50

Salient nutrition labels increase the integration of health attributes in goal-directed food decisions

Laura Enax (with Ian Krajbich, & Bernd Weber)

University of Bonn / Center for Economics and Neuroscience

Food decisions occur very frequently and often require a trade-off between health and taste attributes. Attention was shown to influence attribute weights in the decision value computation. It is unknown how to support individuals in integrating health information into the decision-making process in daily life. Here, we used a binary decision task with salient versus numeric nutrition labels to examine whether salient labels can increase the weight of health attributes in goal-directed choice. Using regressions and drift diffusion modeling, we show that salient labels significantly increase healthy choices, which could be explained by increases in the rate of preference formation (drift rate) towards healthier options only. Salient labels increased the sensitivity to health and decreased the weight on taste, suggesting that the integration process of health and taste attributes is sensitive to how information is displayed. Salient labels proved to be more effective in altering the valuation process towards healthier, goal-directed decisions. We additionally obtained eye-tracking data and will analyze them using the multi-attribute attentional drift diffusion model. Graphical inspection of the obtained data confirm that visual fixations influence the value computation process, which is in line with the theory of the attentional DDM.

Session 1, Thursday, 18:10

Thinking while doing: The influence of ongoing evaluation on choice

Avril Hand (with Denis O'Hara, Petri Pirroinen, & Rick Dale)

National University of Ireland, Galway

When we first notice choices available to us, we are undecided, but gradually we are drawn to one of the available options. Previous work in our laboratory has employed computer mouse-tracking to investigate choice conflict during decisions between gains and losses. The current study investigated whether the removal of "click" requirement in a choice response would affect the accuracy and dynamics of choices. Based on drift diffusion models, it was expected that this manipulation might reduce accuracy and shorten reaction times, as a function of lowering the decision threshold.

Participants were exposed to a set of six conditions in which either varying ratios (4, 2, or 1.4) of rewards (3 conditions) or losses (3 conditions) were provided for choosing arbitrary symbols. In each decision, two of the four symbols are presented creating three possible choice situations: High/High,

High/Low, and Low/Low. In loss conditions, participants began the session with points equal to 36 times the high value loss (e.g., if the high loss was -20, participants began with 720 points). Conditions were presented in a quasi-random order based on a latin square and each provided 36 consecutive choices.

Preliminary analyses indicate that accuracy and acquisition of learning was reduced in the current study relative to previous work. Reaction times were shorter and differences in action dynamics across conditions were less robust than previously observed. These data support an interaction between choice requirements and evaluation and further modifications of the choice requirements will be proposed and considered for future work.

Session 2 – Top-Down/ Bottom-Up Processes

Session 2, Friday, 09:00

The power of attention: Using eye gaze to bias social preference choices

Minou Ghaffari (with Susann Fiedler)

Max Planck Institute for Research on Collective Goods

Research on cognitive processes underlying moral decision-making used the dynamics of eye gaze to bias moral decisions. Yet, it is unclear whether this effect extends to social preference decisions. The present study investigates the influence of gaze behavior during the decision-making process on decisions involving other-regarding preferences. Previous studies have shown that people who are more prosocial direct more attention towards their partner's payoff when considering their options. In order to disentangle the causal influence of attention and inter-individual differences in information search, we recorded participants' eye movements during non- consequential choices (study 1) and consequential choices (study 2). In both studies participants decide between two options, weighing up between what is good for themselves and what is good for the other player. One of the options randomly functioned as a trigger to terminate the information search and prompt the choice. Results indicate that choices can be manipulated by directing attention during information search if participants make non-consequential choices. Yet, when it comes to consequential choices this effect disappears. Implications regarding the stability of social preferences and the role of eye gaze in preference formation are discussed.

Target location probability influences eye movements and decision-making

Nina Chrobot (with Jacob Orquin)

SWPS University of Social Sciences and Humanities & Aarhus University

Knowledge about target location probability enhances top-down control. By top-down control we mean attending to relevant and ignoring irrelevant information. Environment with stable vs random target locations will enhance target location knowledge. Therefore, we predict that environments with stable target locations will enhance top-down control. Given that the target is (ir)relevant and has a stable location, decision-makers become (less) more likely to fixate the target compared to targets in random locations.

By manipulating the stable vs random location for one attribute, we tested this hypothesis in two discrete choice experiments. In the random condition all attributes were randomly located on each of the four alternatives. In the stable condition the target attribute had a stable location while all other attributes had a random location. In the mixed condition the target attribute appeared simultaneously in a stable and random location. Study 1 was a preferential choice task and Study 2 was an inferential task.

In both studies we found the lowest fixation likelihood to the target in the stable condition and the highest in the mixed condition. We calculated the importance of the target attribute with a multinomial logit model using participants' choices as dependent variable. In both studies we found the highest attribute importance in the mixed condition. In Study 1, attribute importance was close to zero in the stable and random conditions. In Study 2, attribute importance was generally higher with the lowest importance in the stable condition matching the distribution of fixation likelihood across conditions.

Our findings suggest that a stable target location enhances top-down control assuming that participants found the target irrelevant. The mixed condition suggests an additive effect of target presence at both locations. Overall, we find a strong effect of fixations on attribute importance with more fixations increasing attribute importance.

Eye movement behind information processing in cross-modal anchoring

Pawel Tomczak

University of Social Sciences and Humanities Faculty in Wrocław

The anchoring effect does not have to rely on numerical anchors. Drawing lines of different length effectively shifts subsequent estimations. This effect, called the cross-modal anchoring, is considered to be a result of magnitude priming caused by the length of the lines - long lines generate a sense of „largeness”, while short lines generate a sense of „smallness”. Is it possible to obtain the cross-modal anchoring without drawing? Instructing participants to observe the lines did not affect the estimations. Yet, there was no relation between the actual length of the drawn lines and the magnitude of estimations, suggesting that it is not the act of drawing itself that generates the sense of „largeness” and „smallness”. In the light of this evidence I hypothesize that the main reason for the observed anchoring effect are the cognitive strategies engaged in processing the lines. Instructing participants to observe the

lines with additional information that they will have to draw them at the end of the experiment should evoke the aforementioned cognitive processes, in result shifting the estimations without drawing. In order to verify possible differences in stimuli processing I intend to compare eye-tracking measures associated with attention and cognitive workload (fixation length, pupil diameter etc.) between different instruction conditions. Verifying possible differences in processing the lines in regard to the eye movement in information acquisition strategies should provide an insight into the mechanism underlying the cross-modal anchoring.

Session 2, Friday, 10:20

Query Theory and the Incumbency Effect: Salient Information is Queried Earlier

Anna Katharina Späti (with Mark J. Brandt, & Marcel Zeelenberg)

Tilburg University

In political elections, voters prefer candidates who are currently in office (incumbents) over new candidates (challengers). The underlying cognitive mechanisms of this bias remain unclear. Using the premise of query theory (Johnson, Häubel, & Keinan, 2007), we examine if the sequence of people's memory retrieval affects political decision making. Consistent with hypotheses, Study 1 ($N = 256$) showed that the incumbency effect was significantly mediated by participants' tendency to first query information about the incumbent. In Study 2 ($N = 446$) we showed the incumbency effect can be reduced and exacerbated by experimentally altering participants' query order. Finally, in Study 3 ($N = 711$) we tested the robustness of the incumbency effect. Studies 1 and 2 were replicated in a neutral condition, but political ideology cues override the effects incumbency. Participants query information about ideologically similar candidates earlier and were also more likely to vote for ideologically similar candidates. Overall, this research provides initial evidence for a cognitive, memory-retrieval process underling the political decision making and the incumbency advantage.

Session 3 – Methods

Session 3, Friday, 11:10

Mousetrap: Free, open-source, and cross-platform mouse-tracking and analysis plug-ins

Felix Henninger (with Pascal Kieslich)

University of Koblenz-Landau & MPI for Research on Collective Goods

Mouse-tracking – the analysis of mouse movements in computerized experiments – is becoming increasingly popular in the cognitive sciences. Specifically, mouse movements are taken as an indicator of commitment to or conflict between choice options during the decision process. Using mouse-tracking, researchers are gaining a better understanding of the temporal development of cognitive processes in a growing number of psychological domains. We present plug-ins that record and analyze mouse-movements in laboratory experiments. First, we introduce plug-ins and corresponding Python packages that add mouse-tracking to OpenSesame, a popular general-purpose graphical experimental builder for the social sciences. In contrast to existing mouse-tracking implementations, mousetrap seamlessly

integrates with existing experimental software and does not require programming skills as it can be easily handled via its graphical interface. Thus, researchers can benefit from the core features of a validated experimental software package and the many extensions available for it (e.g., the integration with auxiliary hardware such as eye-tracking, and the creation of interactive experiments). Second, we introduce the mousetrap library for the statistical programming language R. This library can import, preprocess, aggregate, and visualize mouse trajectories; it calculates a variety of established measures for curvature, complexity, velocity, and acceleration of mouse movements. Importantly, the data need not be collected using the plug-ins presented in the current article, but can, in principle, originate from any mouse-tracking implementation. The presented software is cross-platform, open-source and available free of charge from <https://github.com/pascalkieslich/mousetrap>.

Session 3, Friday, 11:40

Measuring the (dis-)continuous mind

Dirk U. Wulff (with Jonas M. B. Haslbeck, & Michael Schulte-Mecklenbeck)

Max Planck Institute for Human Development

Mouse-tracking studies interpret curved aggregate trajectories as continuous and simultaneous competition between options. The assumptions underlying this interpretation, most importantly whether the aggregate trajectory is a proper representation of trial-level trajectories, remain however inappropriately assessed. In this project, we apply a novel clustering procedure to dozens of published datasets to test the assumed homogeneity in trial-level trajectories. We find that most data sets contain, in substantial proportions, trajectory types that are inconsistent with the aggregate trajectory and the idea of simultaneous and continuous competitions. Our results demand caution for the use of mouse-tracking as an indicator of continuous and simultaneous competition.

Session 3, Friday, 12:10

Interaction of eye and hand in perceptual decision making

Arkady Zgonnikov (with Denis O'Hora, & Petri Piiroinen)

School of Psychology, National University of Ireland, Galway

Tracking eye movements during decision making has provided numerous insights into possible mechanisms of attention and evidence accumulation preceding the actual choice. In a parallel stream of research, mouse/hand trajectories during choice execution are analysed under the assumption that cognition can “leak” into motor output, thereby leaving traces of decision maker’s thought process. At the same time, possible coupling between eye and hand dynamics during decision making remains largely unexplored.

This study is the first one to report joint analysis of synchronized eye-tracking, pupilometry, and mouse-tracking data during decision making. We employ simple motion discrimination task (“random dots” paradigm) to investigate 1) what are the basic patterns of eye-hand coordination during decision making; 2) whether these patterns change with task difficulty (that is, motion coherence); 3) whether there are substantial individual differences in dynamics of such simple decision making, and if so, whether these

differences can be predicted by subjects' personality (as assessed by BIS/BAS, PANAS, and Jackson-5 scales).

Session 3, Friday, 12:40

Fixation sequences as an indicator of decision strategy: An investigation of some properties of the Needleman-Wunsch algorithm

Frank Renkewitz (with Martin Schoemann)

University of Erfurt

A recent methodological development in eye-tracking studies in JDM research advances the application of the Needleman-Wunsch algorithm (NWA). This algorithm determines the similarity between fixation sequences via a global sequence alignment technique. From a process tracing perspective, one major goal of the application of the NWA is to infer from similarity whether identical or different decision strategies were used in different trials or by different participants. Unfortunately, this inference has not been subjected to a closer examination so far, which is the aim of this project. As a first approach, we simulated hypothetical fixation sequences in a risky choice task between two gambles with one alternative each. Simulated sequences were based either on standard Markov models or on two different decision strategies: a probabilistic version of the priority heuristic and decision by sampling. We manipulated the similarity of the underlying transition matrices as well as the amount of random error incorporated in the decision strategies and examined the distribution of the similarity measure given identical or different underlying matrices and decision processes. Furthermore, we assessed the performance of cluster analyses based on the similarity measure. Our results will help to identify boundary conditions under which the NWA is suitable to identify different cognitive processes based on fixation sequences.

Session 4 – Decision Strategies

Session 4, Friday, 14:00

Poor Optimizers, Worse Satisficers

Jacob L. Orquin (with Martin P. Bagger, & Sonja Perkovic)

Aarhus University

As decision makers, we regularly face large numbers of choice options for which the boundaries of the distribution are unknown, e.g. when searching for a cheap product we may not know the price of the cheapest product in the set. When boundaries are unknown, an optimizer must search all options to identify the best option, but as the set size increases optimizing becomes very time consuming. Another solution is to satisfice that is, settle for any option that meets an aspiration level. However, choosing an aspiration level requires knowledge about the distribution, which we may not have. Simulating the opportunity cost of partial search, i.e. the price distance between the cheapest option in the total set and the cheapest option in the set of searched options, we find that satisficers can perform well without an aspiration level by setting a search limit instead. A limited search rule loosely defined as 'search at least five, but no more than ten options' on average identifies an option in the best 10% of the distribution.

When distribution boundaries are unknown, satisficers will therefore benefit from limited search rules while optimizers must search exhaustively. We test whether decision makers adapt to inferential vs preferential tasks by applying exhaustive or limited search. In Study 1 ($N = 72$) we vary the number of options and in Study 2 ($N = 71$) the number of attributes for inferential and preferential decision tasks. Search rules are modeled from eye movement recordings. In both studies, we find substantial heterogeneity, but no effect of task on search rule selection. In Study 1 only five participants applied exhaustive search and of these only one was in the inferential condition. No participants searched exhaustively in Study 2. In general, it holds for both studies that participants searched too little to perform well as optimizers yet too much to perform well as satisficers.

Session 4, Friday, 14:30

The halo effect: cognitive bias or statistical learning in disguise?

Sonja Perkovic (with Jacob Lund Orquin)

Centre for Decision Research, University of Leeds

Why do people perceive organic foods as healthier than conventional foods when in fact there is no evidence for this belief? This organic = health heuristic has so far been explained in terms of a halo effect which implies that positive attitudes towards an object spread to all associated attributes. However, this heuristic may actually be meaningful when applied in the real world rather than in the laboratory. We test this prediction in four studies: a field study, two online surveys and an eye-tracking study. Our findings show that: a) a true correlation exists in the environment between organic food prevalence and less processed food categories, as shown in the field study; b) people are familiar with this statistical structure which is reflected in a highly accurate perception of organic prevalence across food categories; c) positive attitudes towards organic foods do not spread to all attributes as implied by the halo effect; d) manipulating the correlation between organic and health information in an eye tracking experiment leads people to rely more on organic information when judging food healthiness. Put differently, it is possible to experimentally reproduce statistical learning by manipulating the correlation between organic and health information which is observable as an increase in attention to organic cues when judging food healthiness. Our findings imply that decision makers are capable of learning the statistical structure of environment and applying this correctly in the form of a decision heuristic such as the organic = health heuristic. While there may still be merits to the idea of a halo effect, we conclude that the organic = health heuristic is better explained as statistical learning.

Tracing Intuition and Deliberation in Risky Decision Making for Oneself and Others

Kinga Posadzy (with Jan Hausfeld)

Linköping University

The aim of our study is to explore the mechanism behind risky decision-making and how it interplays with intuition and cognition in the decision-making process for oneself and other individuals. Researchers unanimously agree on the importance of risky decision-making for oneself and other individuals. However, there is little agreement on the direction and significance of the differences in self-other choices under risk. For example, Chakravarty et al. (2011) and Pollmann et al. (2014) find that individuals are less risk averse when they make decisions for anonymous others. On the other hand, Eriksen and Kvaløy (2010) show the opposite result: individuals are more risk averse when making decisions for others. However, in this study people affected by the outcome were present in the room during the decision making, hence were less anonymous, making it easier for decision-makers to identify with them. We hypothesize that the differences in findings in the literature can be attributed to different decision-making modes that are induced when making a choice. We propose that the emotions experienced at the moment of decision-making play a more significant role when individuals make decisions for themselves as they are directly affected by the outcomes. On the other hand, making decision for a random, anonymous individual is dispassionate and less emotional since the outcomes do not affect the decision maker directly. Stronger affect experienced during the decision making may activate intuitional processing, while decisions for others might activate more deliberative, cognitive processing (Jung et al., 2013). To identify causal effects of intuition and deliberation, we manipulate processing modes in an eye-tracking experiment and investigate the information search pattern in a risky choice situation for oneself and for another anonymous participant. The results help better understand whether risk preferences are stable or depend on the environment in which a decision is made.

Session 5 – Risky Choices

On the relationship between visual attention biases and loss aversion

Nathaniel J. S. Ashby (with Eldad Yechiam)

Technion - Israel Institute of Technology

Loss aversion – the tendency to weight losses as more important in decision processes than gains - is a commonly reported and heavily studied phenomena. In spite of this cognitive explanations for its occurrence are infrequently provided, and comparisons of loss aversion across decision making tasks (e.g., valuation vs. choices) are rarely undertaken. The current work aimed to fill these gaps by investigating the information uptake process's impact on loss aversion and its consistency across tasks. Participants made valuations of multiple gambles containing both gains and losses (expected values ranged from negative to positive) and also chose between these gambles and an option paying zero with certainty while eye-movements were recorded. On the aggregate, we find little evidence of loss aversion in either decision making context, while on the level of the individual there was a great deal of variability with

some participants exhibiting strong loss aversion while others treated losses as equal to, or even less impactful, than gains. Furthermore, the relationship between loss aversion across decision making contexts was minimal indicating that loss aversion phenomenon might not be as robust as one might expect. Perhaps surprisingly we find that on the aggregate the distribution of visual attention to positive and negative outcomes was biased towards positive outcomes – though on the level of the individual there was a great deal of variability with some participants focusing primarily on positive outcomes while others focused more frequently on negative outcomes, tendencies which were not related across tasks. More importantly however, we find that individual differences in attentional biases to negative outcomes were predictive of loss aversion suggesting that simple biases in visual attention are either diagnostic of, or contribute directly to, loss averse behavior.

Session 5, Friday, 16:00

You win some, you lose some: Tracking Emotions in Risky Gambles

Michael Schulte-Mecklenbeck (with Susann Fiedler)

University of Bern / MPIB Berlin

Emotions focus our attention and help us evaluate risks (in real life as well as in artificial situations). The classification of emotions during an experiment has been done, e.g., through self-report (Mellers et al., 1997) or RAs having a miserable time coding videos. We evaluate the software iMotions that allows the online classification of several different emotions (joy, anger, sadness, surprise, fear, contempt and disgust; as well as general valuations positive, negative and neutral) automatically and concurrently. In doing so we let participants decide to play/or not play in a two option risky gamble and record their emotional reactions to feedback about their gains/losses. We will report results of our analysis and general learnings of recording/analysing emotions in 2016.

Session 5, Friday, 16:20

The role of eye movements in contextual risky choice

Felix Molter (with Hauke R. Heekeren, Scott A. Huettel, & Peter N. C. Mohr)

WZB Social Science Research Center, Berlin, Germany

Background: Context effects are defined as changes in preference depending on the set of available options (e.g., Simonson, 1989). They violate traditional axioms of rational choice and the mechanisms leading to their emergence are still under debate. Unlike utility based models of preferential choice, more sophisticated evidence accumulation frameworks like Multialternative Decision Field Theory (Roe, Busemeyer, & Townsend, 2001) are theoretically able to account for these effects. Recently, visual attention has been ascribed a more constructive and active role in preference formation, leading to the development of attention based models of choice (Krajbich, Armel, & Rangel, 2010). Yet it remains unclear how attentional models perform in the contextual setting and how they compare against other model classes.

Methods: Subjects performed a straightforward incentive compatible three alternative forced choice task between risky gambles that were individually tailored and specifically designed to elicit context effects.

Eye movements were recorded throughout the experiment. Choice behavior and eye movements were analyzed psychometrically. A quantitative model comparison was performed between utility based, connectionist evidence accumulation and attentional models of decision making.

Results: The experiment replicated the attraction effect and demonstrated the compromise effect for the first time in risky choice. Eye tracking data suggest a clear correspondence between visual attention and choice behavior, replicating the gaze cascade effect (S. Shimojo, Simion, Shimojo, & Scheier, 2003). The quantitative model comparison revealed that model performance is superior for models that weigh utility measures with the relative amount of visual attention (i.e., relative dwell time) an option received.

Conclusion: We conclude that visual attention is inherently linked to preference formation in preferential choice and that computational models of decision making can greatly benefit from a higher integration with attentional mechanisms.

Session 6 – Intertemporal Choice

Session 6, Friday, 17:00

Comparing the underlying process between intertemporal choice and risky choice

Lei Zhou (with Lei Zhang, & Zhu-Yuan Liang)

Institute of Psychology, Chinese Academy of Sciences

Both Intertemporal choice (IC) and risky choice (RC) involve discounting, i.e., temporal discounting and probability discounting. Various studies have compared temporal discounting of IC with probability discounting of RC yet results do not reach consensus. To date, we still lack extended evidence to reveal the comparison of the underlying process between IC and RC in depth. We utilized eye-tracking technology to investigate the underlying process of IC and RC and examined whether they share similar cognitive mechanisms. Before the experimental session, an adjustment procedure was used to generate pairs of approximately equivalent IC and RC options for each participant. During the experimental tasks, eye-tracking technology was used to directly examine the underlying process of those pre-determined option pairs of IC and RC. We fit several computational models to participants' IC and RC with hierarchical Bayesian parameter estimate, respectively. Formal Bayesian model comparison procedure revealed that intertemporal choices can be best explained by a simple heuristic logistic model in comparison with hyperbolic, exponential, and constant sensitivity models, whereas all models did not perform differently when fit them to risk choices. As for the eye movement pattern, we found that participants paid more attention to delay/probability than monetary amounts in both tasks. However, attention was paid more to larger amounts and their probabilities in RC, but no such attentional pattern was found in IC. Furthermore, to examine the dynamic and holistic process, we applied a scanpath analysis and found that similarity scores of the intra-conditions were significantly higher than those of the inter-condition, which indicated that IC and RC have different scanpath pattern. Our findings indicated that the cognitive mechanism between IC and RC are different.

Hand and eye movement during intertemporal choice

Denis O'Hora (with Stefan Scherbaum, & Patrick Donlon)

National University of Ireland, Galway

Intertemporal choices require the person to choose between options that have varying consequences at varying delays. Such decisions are commonplace, especially in relation to health and financial outcomes, and can have significant personal and societal impacts. Individuals typically overweight short-term outcomes compared to longer-term outcomes, but this tendency varies across people with some being more concerned with short-term outcomes than others. It is also possible for the same individual to differentially weight delay across different contexts.

Intertemporal choices are complex, including at least two different types of information: the gains or losses for each option and the delays at which these gains or losses will occur. This presentation will consider how tracking computer mouse movement and eye movement during intertemporal choices may help to highlight how such choices are made. Data from a large public experiment in which computer mouse responses of over 600 individuals during intertemporal choices will be summarized, in addition to recent experiments from other laboratories. Preliminary eyetracking data of participants completing a laboratory-based version of the Monetary Choice Questionnaire, a standard measure of intertemporal choice, will also be reported.

The implications of these data from current theories of intertemporal choice and future empirical research will be considered.

Distinguishing Comparison Strategies in Intertemporal Decision Making

Martin Schoemann (with Stefan Scherbaum, & Frank Renkewitz)

Technische Universität Dresden

In intertemporal decision making, individuals prefer smaller rewards delivered sooner over larger reward delivered later. Although an increasing number of both structural and process models have been proposed to account for this behavior, the cognitive processes underlying intertemporal choice are still unclear. The way individuals compare alternatives against each other, that is, the comparison strategy, is an essential process. In this study, different properties of the traditional intertemporal choice paradigm were manipulated as they might trigger different processes. These properties were the dominance of alternatives and the layout in which alternatives are presented. While participants had to choose between two hypothetical options (sooner/smaller vs. later/larger), participants' eye-movements were recorded. It was observed that the comparison strategy is not affected by dominance but by the layout. Additionally, the results propose that participants' choices depend on the layout used in the paradigm, supposing that the traditional intertemporal choice paradigm and all models that have been developed using it should further be questioned. Overall, results surprisingly suggest that eye-tracking measures may allow for a better theoretical understanding of the processes involved in intertemporal choice but are not connected as strongly to the decision making process as assumed initially.

Session 7 – Individual Differences

Session 7, Saturday, 09:00

Assessing individual decision thresholds with KETO – a short behavioral decision making test under uncertainty

Daniel Hausmann (with Julia Stoll)

University of Zurich, Department of Psychology

People differ in the way they make decisions under uncertainty and which desired level of confidence they aspire. To assess these individual differences, a behavior-based short decision making test online (KETO) was created, which detects the preferred decision making strategy under standardized conditions, as well as the desired level of confidence (DLC) on the basis of an experimental and constraining procedure. KETO is an attractive and complex virtual game – for participants not easy to decode – and includes 22 comparable decision making tasks, in which one of four options has to be chosen with the help of zero to maximal five probabilistic cues on an information board (see <http://keto.dah-media.ch/?xt=EGPROC16>).

Validity and retest-reliability has been tested with more than 1'000 participants. Results show that KETO is an appropriate method to measure individual decision thresholds (desired level of confidence, DLC) accurately to per centum. The DLC positively correlates with dimensions of risk perception and negatively with risk behavior. The DLC is independent of motivation, need for cognition, maximization, or the BIG Five.

Just in the context of risk and decision making, behavior-based tests with a quasi-realistic scenario can have additional benefits for personality research, first, as behavior-based assessment are closer to real behavior as conventional questionnaires, and second, they provide additional information such as consistency, normativity, or adaptivity of individual behavior.

Session 7, Saturday, 09:30

The Price of Fear: Developing a behavioural assessment of fear-related avoidance incorporating dynamic response measures.

Santiago Garcia-Guerrero (with Denis O'Hora)

National University of Ireland, Galway

What is the price of fear? The greater your fear, the more you will forego in order to avoid that feared outcome. In economics, “willingness to pay” reflects subjective value and it is employed to price goods, or more recently, to price negative outcomes. The current paper proposes a novel protocol for the behavioural assessment of fear-related avoidance, based on how much an individual is willing to pay to avoid their fears.

The proposed protocol consists of a “card game” interface in which participants will make choices in several stages. During baseline, participants choose between two decks that provide differential points or monetary rewards. Following baseline, in the first experimental block, a feared stimulus (e.g. a spider

image) is presented in addition to rewards when the richer deck is chosen. Based on the participants performance, rewards are then manipulated across blocks to establish the value of the feared stimulus. If participants choose the richer deck with the spider, the rewards for the richer deck are reduced towards the rewards for the poorer deck, but if participants choose the poorer deck, then the rewards for the poorer deck are reduced to increase the difference in rewards between decks.

To test the validity of the values of the feared stimuli established in this protocol, they will be compared to scale measures of spider fear. In addition, differing strengths of feared stimulus (e.g., moving vs stationary spiders) will be employed to establish whether the values are greater for stronger stimuli.

During experimental blocks, eye movement and computer mouse movement will be tracked and compared for individuals who price the feared stimulus at different levels.

Session 7, Saturday, 10:00

Differences in cognitive representation of probability as a function of numeracy

Kamil Fulawka (with Jakub Traczyk)

University of Social Sciences and Humanities, faculty in Wroclaw

Understanding probabilistic information is a crucial ability for making informed decisions in today's society. Although probability concepts are introduced relatively early in education, public still struggles with understanding what probability actually means or to what reference class probabilistic information refers to, if it is not explicitly stated. Growing body of research shows that statistical numeracy, the ability to understand and process statistical and probability information, is a strong predictor for superior decision making across domains when decision problems are presented using numerical formats. Highly numerate individuals are shown to more often make choices based on EV strategy, perform deep heuristic processing or deliberate longer on decision problems, whereas low numeracy is associated with more frequent use of least-likely heuristic and higher susceptibility to biases (like denominator neglect or framing effect). Researchers agree that low numerate people process probabilities differently, rather than neglect them altogether. Peters (2006) proposed that for low numerate people probability is simply less informative. This may mean that representation of probability as a concept is of worse quality among low numerate individuals. Basing on this hypothesis, we predicted that given the opportunity to place bets onto probabilities regarding correctness of performance, highly numerate individuals should behave more consistently, meaning that they would place bets of similar values onto given probability. Preliminary results supported our hypothesis. Nonetheless, some low numerate participants also behave highly consistently, which suggest that knowing computational algorithms is not essential for generating consistent behavior based on probability. We propose that whereas among highly numerate individuals comprehending probability as a concept seems inherent, among low numerate participants the phenomenon is not so straightforward. Thus, we would like to open a discussion about the quality of probability representation as possible cause for engaging different processes during decision making.

Session 8 – Social Dilemma I

Session 8, Saturday, 11:00

Processes of Construal & Depth of Processing: Does The Interaction Explain “Contextual Framing Effects”?

Ozan Isler (with John Maule, & Chris Starmer)

University of Nottingham

Previous research has shown that (1) contextual cues affect cooperative behaviour via construal processes (e.g., Kay & Ross 2003), and that (2) intuitive vs. deliberative thinking significantly affect cooperation (e.g., Rand et al 2012). Despite some recent attention (e.g., Rand et al 2014), the possible interaction of construal and depth of processing remains relatively unexplored. For example, it is still an open question whether “contextual framing effects” (i.e., effects of contextual associations enabled by labels and other cues) are due to cognitive biases associated with intuitive thinking that might weaken with deliberation, or whether they are a result of rational processes of interpretation that might strengthen with deliberation (e.g., Igou & Bless 2007). We outline an experimental design that uses a one-shot public good game to investigate the possible interaction of these two cognitive processes as moderating the effects of contextual cues on cooperative behaviour. In our proposed experiment, we manipulate both depth of processing (using time limits to enable intuitive or deliberative thinking) and construal (using label frames to describe the context in either abstract or concrete terms, and naming the game either as a “moral” or a “mathematical problem”). This design allows us to test whether contextual cues have stronger effects in abstract contexts that are relatively more open to interpretation, and whether depth of processing interacts with this relationship.

Session 8, Saturday, 11:20

Use Your Brains! Effects of Analytical Thinking on Strategic Sophistication

David Dohmen (with Peter M. Gollwitzer, Urs Fischbacher, & Gabriele Oettingen)

University of Konstanz & Thurgau Institute of Economics (TWI)

People substantially differ in strategic sophistication. While part of this heterogeneity relates to cognitive ability, it has so far been unclear what role different modes of processing play. In this investigation, we focus on analytical thinking (i.e., the degree to which people actually make use of their cognitive ability and resources) as a further crucial factor that may influence strategic sophistication. Our main experiment features a series of Beauty Contest games with varying winning factors and relies on Mental Contrasting with Implementation Intentions (MCII), a self-regulatory strategy from goal psychology introduced by Oettingen and Gollwitzer (2010), to induce either a more analytical or a more intuitive (and thus less analytical) mode of processing. In a pre-session, we elicit cognitive ability and baseline guesses. We find that both a higher degree of analytical thinking and higher cognitive ability improve strategic sophistication: (1) Individuals’ guesses lie closer to the respective Nash equilibrium and (2) the numbers they choose are less often dominated. Most importantly, (3) people improve in their strategic performance as guesses are more precise (i.e., deviate less from target values). Comparing participants’ guesses between the two experimental sessions, we additionally find that those in a more intuitive mode profit less from experience. For such learning from experience, cognitive ability only

relates to the level of guessing precision and not to whether people learn at all. Besides these effects, our results also indicate that participants adapt to information about the strategic abilities of others.

Session 8, Saturday, 11:40

Testing the level of consistency between choices and beliefs in games using eye-tracking

Luca Polonio (with Giorgio Coricelli)

Center for Mind/Brain Sciences, University of Trento

We use eye-tracking technique to test whether players' actions are consistent with their expectations of their opponent's behavior. Participants play a series of two-player 3 by 3 one shot games and state their beliefs about which actions they expect their counterpart to play (first-order beliefs) or about which actions their counterparts expect them to play (second-order beliefs). We perform a mixed model cluster analysis and classify participants into types according to both their attentional patterns of visual information acquisition and choices. Players classified as strategic (Level-2 players) and players classified as having other-regarding preferences like Inequity aversion and Prosociality exhibit patterns of visual attention and choices that are mainly consistent with their stated beliefs. Conversely, players classified as non-strategic (Level-1, Pessimistic, Optimistic and Competitive) do not best respond to any specific belief, but apply simple decision rules regardless of whether they are playing or stating their beliefs. Thus, using eye-tracking data we could identify a larger consistency between actions and stated beliefs compared with previous studies, and we could characterize the behavioral rules associated with choice-beliefs inconsistency. Implications for the theories of bounded rationality are discussed.

Session 9 – Social Dilemma II

Session 9, Saturday, 13:00

What drives the (un)empathic bystander to intervene? Eye-tracking recordings of third-party decision making

Yang Hu (with Bernd Weber, & Susann Fiedler)

Center for Economics and Neuroscience (CENs), University of Bonn

People show costly altruistic behaviors by responding to norm violations (e.g. unfairness) even if they are not directly involved as bystanders. This third-party altruistic decision-making is shown to be influenced by the individual empathic concern (EC) level. However, the cognitive mechanism underlying this modulation remains largely unclear. The current study aims to address this question by combining a modified third-party economic paradigm with eye-tracking in an incentivized context. First, we collected decisions from online first-party (potential offenders), who decided about the money allocation between themselves and anonymous second-party (potential victims). Their decisions were presented to the participants, as third parties, of the eye-tracking study. The third party participants voluntarily decided whether, and then how much, they want to punish the offender or help the victim who was treated unfairly using their own monetary endowment. Additionally, participants did the same task again but were unexpectedly asked to focus on either the (un)fair conduct of the offender or the feeling of the

victim, respectively, before making their choices. Replicating the positive correlation between trait empathy of third-party observers and helping choices, we further show that individual differences in EC also influence the fixation proportion towards victim-relevant information during decision making, even regardless of manipulation of the exogenously induced attention focus. Our results indicate that trait empathy influences third party's altruistic choice via modulating attention, which might serve as the potential underlying cognitive mechanism.

Session 9, Saturday, 13:20

Response time and click position: Cheap indicators of preferences

Fadong Chen (with Urs Fischbacher)

University of Konstanz/Thurgau Institute of Economics

This paper investigates how process data like response time and click position relates to economic decisions. We use a social value orientation experiment, which can be considered as a prototypical multi-attribute decision problem. We find that in the social value orientation task more individualistic subjects have shorter response times than prosocial subjects. Individualistic subjects click more often on their own payoffs than on the others' payoffs, and they click more often on their own payoffs than prosocial subjects. These results show that response times and click positions can be used as indicators of people's preferences.

Session 9, Saturday, 13:50

Blind to Groups: Understanding Group Membership Consideration in Visual Information Search in Intergroup Dilemmas

Rima-Maria Rahal (with Carsten De Dreu, & Susann Fiedler)

Max Planck Institute for Research on Collective Goods

In intergroup decisions, self-interest, ingroup love and outgroup hate collide. In two studies, we investigate the processes underlying intergroup decision making using eye tracking. Results regarding choice behavior replicate ingroup favoritism in terms of an increased probability of making altruistic choices in resource allocation tasks concerning the in- vs. outgroup. Group identifying information, however, was visually attended to only infrequently, and determined whether in-group bias was shown. Exploring group membership consideration in visual information search revealed that aversion to inequality in societal income distributions as well as low social dominance orientation predicted reduced gazes to group membership information, and that people how avoided group membership information in visual information search were also less likely to state a preference for learning the group membership of a second player in a dictator game. Moreover, we found that more cooperative decision makers consistently made more altruistic choices. Finally, results indicate an interaction between intergroup setting and decision maker's SVO: the influence of SVO on altruistic choices was more pronounced in the ingroup setting. Moreover, we report systematic differences in visual information search of decision makers in in- vs. outgroup decision depending on SVO. More cooperative decision makers showed increased response times and number of fixations, inspected more information and allocated less

attention to their own payoffs. The same pattern was found regarding decisions made towards the in- vs. outgroup. Moreover, we found a significant interaction indicating that only individualistic decision makers invested relatively less effort into information search when making outgroup decisions, whereas with increasing SVO, decision makers showed more similar gaze behavior for in- and outgroup decisions. Implications for intergroup research and resolutions for intergroup conflict are discussed.

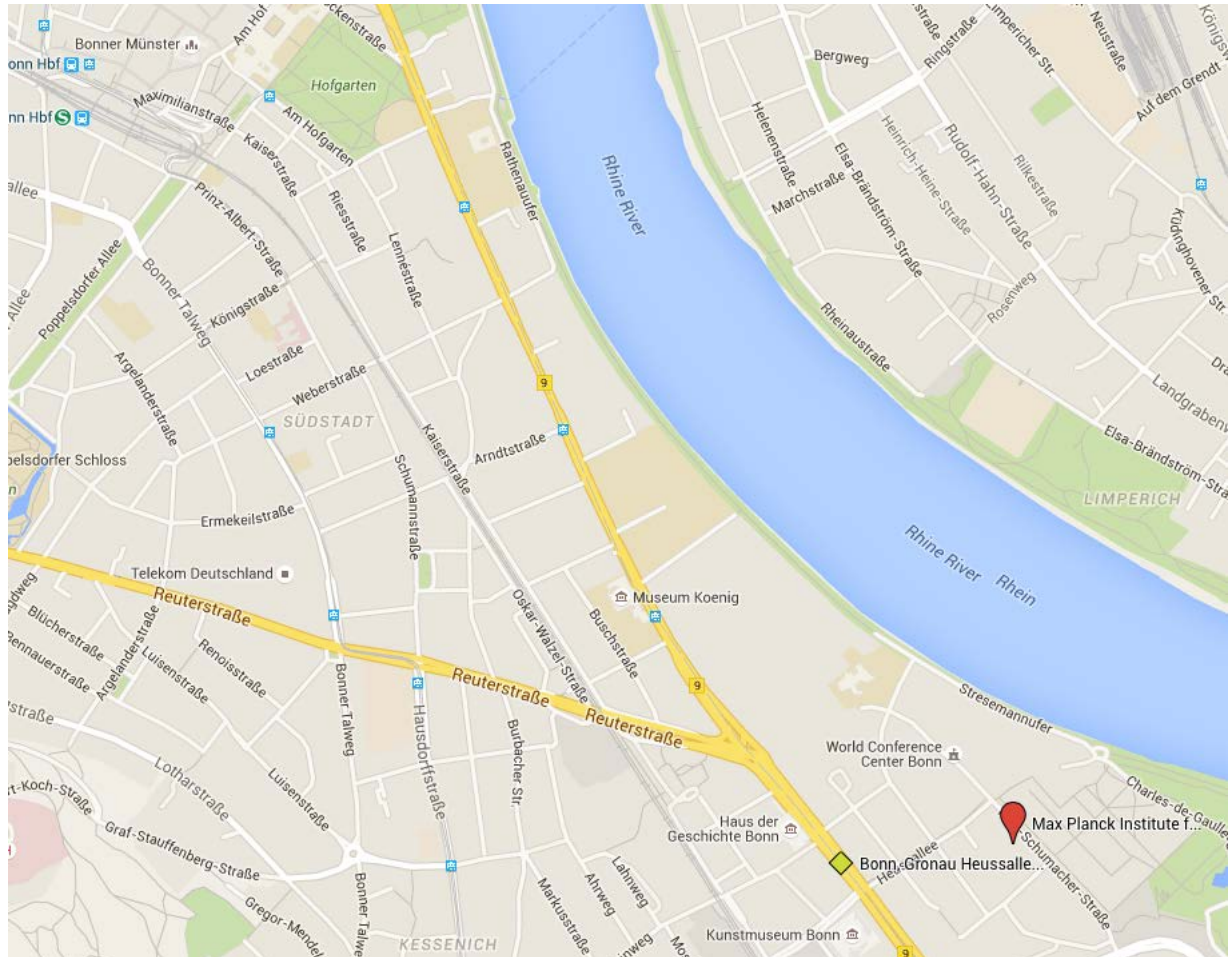
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GETTING AROUND IN BONN

Map with Central Station, Rhine and Conference Venue



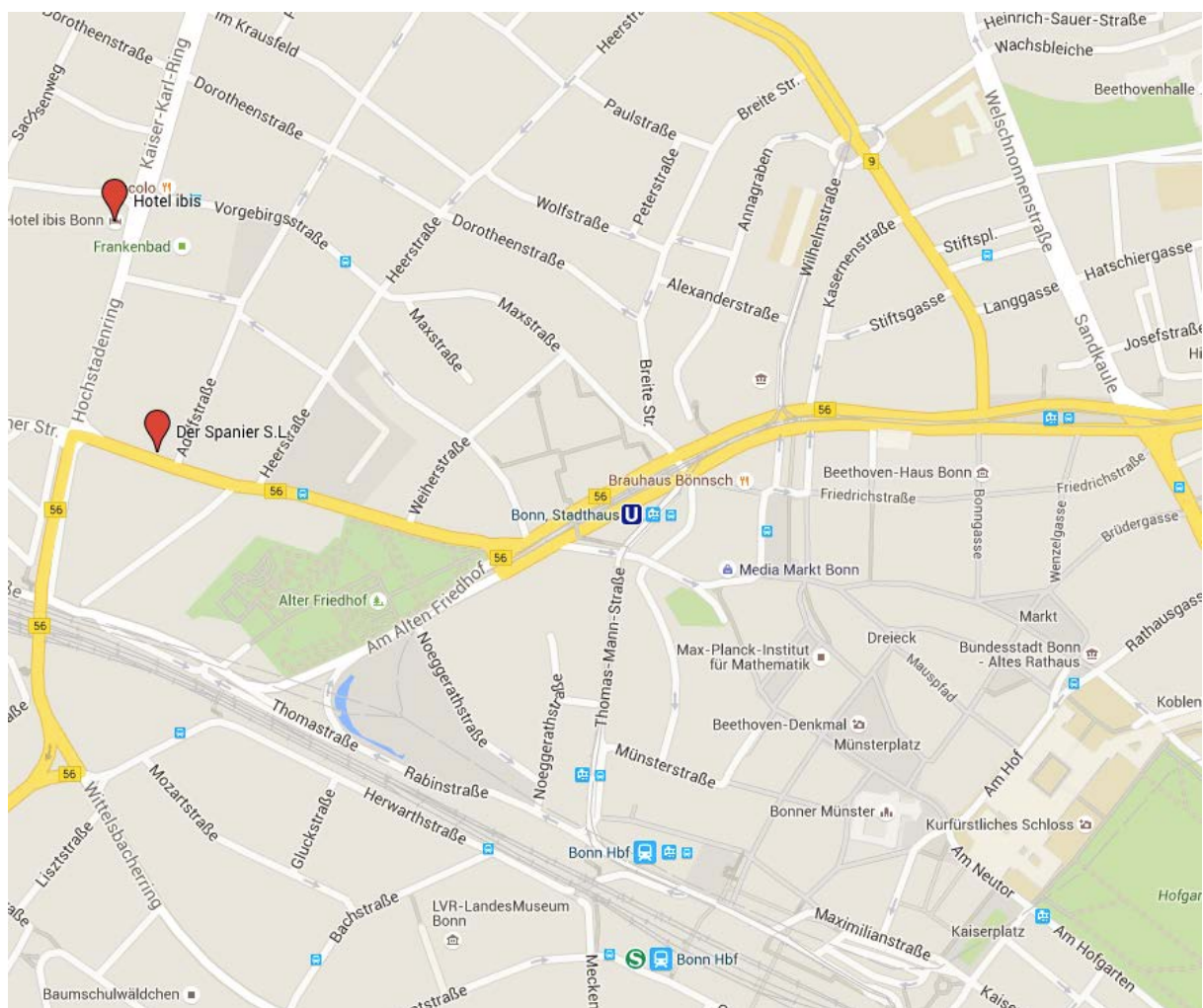
Max Planck Institute for Research on Collective Goods, Kurt-Schumacher-Str. 10

Around the MPI

Several interesting sights are located only a convenient walk away from the MPI. If you find yourself with a bit of time on your hands, consider paying a visit to the following places:

- *Haus der Geschichte* (house of history), free entry (Willy-Brandt-Allee 14)
- *Kunstmuseum* (museum of art): Berliner Platz 2
- *The Rhine*: The people living in Bonn are very proud of their river, the Rhine. There you can walk, sit at the riverside and have a talk, enjoy the view or go on a boat trip.

Map with suggested Hotel, Dinner location on Friday, City Center



Hotel ibis, Vorgebirgsstraße 33; Der Spanier (“El Español”), Bornheimer Str. 76

In the city center

The city center of Bonn has numerous sights that are easily reached with a leisurely evening stroll.

To get there, use the public transport stops *Universität / Markt* and *Bonn Hauptbahnhof* for the southern part of the city center, and *Bonn, Stadthaus* (lines 61, 62, 66, 67) for easy access to the old town.

Once you’re walking around, make sure to visit the following sights:

- *Beethoven House*: Bonn is sometimes called Beethovenstadt because the famous composer was born there. You can visit his place of birth including a museum in Bonngasse 20.
- *Sterntor*: The Sterntor gate on the northern side of Böttcherplatz is a testimony to the city’s medieval fortifications and consists of the remains of the original Sterntor, what is left of the city walls and an old half tower.

- *Altes Rathaus* (Old Town Hall): Markt. Built between 1737 and 1738 under the rule of Elector Clemens August. The steps leading up to the building are world-famous due to numerous receptions for State guests.
- *Universität / Markt* (University of Bonn): Regina-Pacis-Weg. The University of Bonn, the former electoral residence, was founded in 1818 by King Friedrich-Wilhelm III. The long east wing of the building reaches almost to the Rhine. A gilded archangel flies in splendour over the ‘Koblenzer Tor’ (Coblenz Gate), which was designed by Michel Leveilly and built into the impressive façade of the gate.
- *Münsterbasilika mit Kreuzgang* (Minster Basilica with Cloister): Münsterplatz. Bonn’s nine-hundred-year-old minster basilica was built on a Roman burial ground. The basilica’s 12th-century Romanesque cloister and its powerful, yet slender-looking, 92 m high spire make it well worth a visit.
- *Old Town*: Heerstraße. In Bonn’s old town, you will not only find the cherry trees that makes this quarter a restful retreat in spring, but also a number of atmospheric bars and pubs.

If you want more

If you are planning on spending more time looking around in Bonn and around, here are some more ideas for places to visit:

- *Arithmeum*: Collection of adding-machines (Lennéstraße 2)
- Zoologisches Forschungsmuseum Alexander Koenig (Zoological Research Museum Alexander Koenig): Adenauerallee 160
- *Kölner Dom*: From Bonn, it’s only ~30 minutes by train to Köln/Cologne. Among other things, you can visit the famous Cologne Cathedral there, which has been listed as a UNESCO world cultural heritage site since 1996.
- *Südstadt*: The Südstadt quarter, between Regina-Pacis-Weg, Poppelsdorfer Allee, Reuterstraße, Kaiserstraße, Weberstraße and the Rhine, is often referred to (along with Bonn’s Weststadt) as the largest connected and preserved Wilhelminian quarter in Germany. If you are visiting this area, make sure to stop by the Botanical Gardens and the Poppelsdorf Castle.



IMPRESSUM

Max Planck Institute for Research on Collective Goods

Kurt-Schumacher-Str. 10, 53113 Bonn

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