

SPUDM24

Subjective Probability, Utility,
and Decision Making Conference

Barcelona, August 18-22, 2013



Dear Friends and Colleagues,

It is our great pleasure to invite you to attend the **24th Subjective Probability, Utility, and Decision Making Conference**.

SPUDM 2013, will be held at IESE Business School - University of Navarra in Barcelona, Spain from Sunday, the 18th till Thursday, the 22nd of August 2013.

The organizing committee is pleased to announce that the conference will feature the following **invited speakers**:

Timothy D. Wilson, University of Virginia, USA

Colin F. Camerer, California Institute of Technology, USA

Robin Hogarth, Universitat Pompeu Fabra, Spain

Ralph Hertwig, Max Planck Institute for Human Development, Berlin, Germany

Attending this meeting will also be an opportunity to discover Barcelona, one of the most unique and architecturally distinctive cities of the world. Barcelona is the capital of Spain's Catalan region, which has produced a number of the world's most prominent artists including Pablo Picasso and Salvador Dalí. The architect Antoni Gaudí also left his indelible mark on the city through a number of remarkable buildings such as La Sagrada Família, La Pedrera, and La Casa Batlló.

Welcome to Barcelona!

The local organizing committee:

Elena Reustkaja, Mario Capizzani, Franz Heukamp, and Robin Hogarth.

Scientific committee

Elena Reutskaja, IESE Business School, Spain (Chair)

Barbara Summers, University of Leeds, UK

Valerie Reyna, Cornell University, USA

Robin Hogarth, Universitat Pompeu Fabra, Spain

Richárd Szántó, Corvinus University of Budapest, Hungary

The local organizing committee

Elena Reutskaja, IESE Business School, Spain

Mario Capizzani, IESE Business School, Spain

Franz Heukamp, IESE Business School, Spain

Robin Hogarth, Universitat Pompeu Fabra, Spain

The Host Institution in Spain

IESE Business School, Spain

Website

[http://www.iese.edu/ SPUDM24](http://www.iese.edu/SPUDM24)

GENERAL INFORMATION

Assigned rooms

The Conference sessions as well as Panel Sessions will take place at the Auditorium, and Coffee breaks in the Hall Q-300 and Lunches will be held in the South Campus Dining Room. For parallel sessions assigned rooms, please refer to the program.

Presentations in Sessions

In order to meet our timetable, we ask for maximum punctuality. All rooms are provided with PC and overhead projectors. If you are going to use a PowerPoint file, please go to your room at least 10 minutes before the presentation in order to save it in the local computer. If you need any additional equipment for your presentation, please contact the organizing committee.

Guidelines for Symposia, Presentations and Posters

Symposia Guidelines:

To allow full discussion, workshop presentations should not exceed 15-20 minutes. Conveners are kindly requested to enforce these time limits.

Oral Presentations Guidelines:

Presenters will have 15 minutes for their talks followed by 5 minutes for questions and discussion. Chairpersons are kindly requested to follow strictly the time limits.

Poster Guidelines:

Poster presenters or co-author(s) must prepare and set up a poster for display. Poster presenters or co-author(s) need to be present at their poster to interact with attendees.

At the time of setting up, each poster will be assigned a number that indicates where it should be mounted. The total space available for the poster and supporting materials is 100 x 250cm. We would recommend a poster size of 100 cm (width) x 120 cm (height).

Poster presenters or co-authors should mount the materials on the tack board assigned. Bring: transparent tape to mount the poster, the poster itself, and 1-page handouts.

We recommend preparing a handout explaining the work and make enough copies for distribution.

Be physically present at the poster and take down the materials after the session.

Wireless Access in our Campus

If you are bringing your laptop to IESE, you have the possibility to use our wireless network to access the Internet. Guest users should know that:

-We are not responsible for any virus that may possibly affect your computer. We recommend

the use of an antivirus program and an updated Operative System.

-Unfortunately, not all computers are compatible with our wireless network.

The IESE wireless network can be accessed with the following user information:

Username: wireless

Password: Guest.08

Computer area

There will be free access to computers in the Hall Q-100.

Dress code

While the general dress code for the Conference is informal, we recommend more formal attire for presenters. Business casual would be appropriate for everyone.

Taxis

If you need a taxi, please contact a member of the Organizing Committee.

Conference Office

From Monday to Thursday, the conference office will be located in the Entrance Hall of the Auditorium.

CONFERENCE PROGRAM

	Sunday 18th
16.00pm-17.30pm	REGISTRATION
17.30pm-18.00pm	Opening and Welcome
18.00pm-19.00pm	Presidential address: Making a wrong decision is understandable, but we know better. Cilia Witteman, EADM President 2013-2015.
19.00pm-20.00pm	Welcome Cocktail

				Monday 19th			
8.00am-9.00am	REGISTRATION						
8.50am-9.00am				Welcome			
9.00am-10.00am	KEYNOTE ADDRESS I: Simple heuristics in a social world? Ralph Hertwig, Max Planck Institute for Human Development, Germany						
10.00am-10.30am	Aula magna Coffee Break						
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401	Q-402
	Uncertainty and Probability (I)	Theoretical Perspectives	Social Aspects in JDM (I)	Judgement and Intuition (I)	Emotions (I)	Financial JDM (I)	Other Topics (I)
	Chair: David Rothschild	Chair: Henrik Olsson	Chair: Mike Yeomans	Chair: Marta Stragà	Chair: Yaniv Shani	Chair: Enrico Rubaltelli	Chair: W. Gaissmaier
	A Competition among New Methods for Eliciting Probability Distributions. David Rothschild, Daniel G. Goldstein, & Florian Teschner	A unified framework for analyzing and improving individual and group judgment. Henrik Olsson	Asking Too Much? Measuring the Collateral Costs of Fundraising. Mike Yeomans	Do you want to see the sequel? Global judgments vs. episodic recollection in the prediction of future intentions. Marta Stragà	Why Consumers Prefer Products Associated with Purchase Opportunities that were Missed over Purchase Opportunities that will be Missed. Yaniv Shani, Shai Danziger, Yael Shani Feinstein, & Marcel Zanna	Investing Morally: Psychological Determinants and Implications. Enrico Rubaltelli	9/11, Act II: A Fine-grained Analysis of Regional Variations in Traffic Fatalities in the Aftermath of the Terrorist Attacks. Wolfgang Gaissmaier & Gerd Gigerenzer
	A Direct Method for Measuring Discounting of Monetary Profiles. Zhenxing Huang, Peter Wakker, Han Bleichrodt, Arthur Attema, & Yu Gao	Multi-alternative Decision by Sampling: toward an empirically supported process model. Takao Noguchi, Neil Stewart, & Adam Sanborn	Benefiting from harm: When harmless actions are judged to be morally blameworthy. Yoel Inbar	Why is your neighbor's grass greener - or is it? Orit Tykocinski	Bounded emotion, the psychophysics of affect and scope: Collapse of affect in donation and non-donation judgment tasks. Daniel Västfjäll, William Hagman, Stephan Dickert, & Paul Slovic	Personal borrowing and repayment decisions: Mental accounting and the role of cost and loan duration information. Rob Ranyard	A Signal Detection Theory Analysis of Decision Making in the Referral and Substantiation Processes of the U.S. Child Welfare Services System. Jeryl Mumpower & Gary McClelland
10.30am-12.30pm	Acting informatively: How people learn causal structure through sequences of interventions. Neil Bramley, David Lagnado, & Maarten Speekenbrink	Beyond Dual Processes in Framing and Temporal Discounting: A Fuzzy-Trace Theory Account of Risky Decision Making. Valerie F. Reyna, Evan A. Wilhelms, Rebecca B. Weldon, Priscila G. Brust Renck, & Jonathan C. Corbin	Competitive games of timing: How competition affects information search and choice. Nathaniel David Phillips, Ralph Hertwig, Yaakov Kareev, & Judith Avrahami	Hindsight Bias Affects Creativity Judgments. Marieke Roskes, Daniël J. Sligte, Matthijs Baas, Bernard A. Nijstad, & Carsten K.W. De Dreu	How impulsivity and time affect inter-temporal decisions in normal and pathological gamblers. Alessandro Grecucci	Early life investment experience and portfolio choice during booms. Dimitra Papadovasilaki	Effect of Induced Entrepreneurial Mindset on Venture-Decision Confidence. Peter Boyle
	Ambiguity Attitudes over Time. Yuanyuan Liu & Ayse Onculer	Reconciling irrational and adaptive views of heuristics. Paula Parpart, Matt Jones, & Bradley C. Love	Does vicarious learning help to escape the trap of competition in a social dilemma game? Guillaume Blanc, Ulrich Hoffrage, Jan Woike, & Sebastian	Improving estimation through active feedback. Bonnie Claire Wintle; presented by Aidan Lyon	Imagery, stress, and risk perception: The role of affect-laden imagery in risk perception. Jakub Traczyk, Agata Sobkow, & Tomasz Zaleskiewicz	An Empirical Test of Competing Hypotheses for the Annuity Puzzle. Michael Goedde-Menke, Moritz Lehmsiek-Stärke, & Sven Nolte	International Alliance Partner Selection: Experimental Assessment of Decision Making Process. Andriy Ivchenko & Antonio Ladrón
	Are people optimistic in their belief updating? Formal analysis and new evidence suggests not. Adam J. L. Harris, Punit Shah, Ulrike Hahn, Caroline Catmur, &	The Combined Connectedness Principle: How Psychological Connectedness Guides Preferences. Henry Montgomery & William Montgomery	The justice spray: The role of oxytocin in social norm enforcement. Mirre Stallen	Rational and still biased? How profit-maximizing can lead to biased judgments. Max Ihmels & Florian Kutzner	Issue specific emotionality: Beyond effects of utility. Simone Moran & Ilana Ritov	Income Tax Reduces Productivity, Unless People are Both Egalitarian and Communitarian. Scott Rick, Gabriele Paolacci, & Katherine Burson	Group and individual adaptation to changing environments. Tomás Lejarraga, José Lejarraga, & Cleotilde Gonzalez
	Are probability judgments made at an early stage better or worse than those made at a later stage? Two studies of how well betting experts forecast football results. Patrik Andersson, Håkan Nilsson, & Gustaf		The Case of the "Appropriate Adult" in Advising and Self-Other Decision Making. Mandeep K. Dhami & Rocio Garcia-Retamero		Proud to Cooperate: The Effects of Pride versus Joy on Cooperation in Social Dilemmas. Anna Dorfman, Yoella Bereby-Meyer, & Tal Eyal	Examining the bright side of high confidence in tight financial situations. Kathrin Johansen	Overconfidence or noisy beliefs? An experimental study of excess entry. Sabrina Artinger & Thomas C. Powell
12.30pm-1.30pm	Lunch (South Campus)						

			Monday 19th				
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401	Q-402
	Uncertainty and Probability (II)	Choice (I)	Social Aspects in JDM (II)	Judgement and Intuition (II)	Emotions (II)	Financial JDM (II)	Consumer JDM (I)
	Chair: Marus Lindskog	Chair: Melike Erdogan	Chair: Yoella Bereby-Meyer	Chair: Nigel Harvey	Chair: Andrea Louise Taylor	Chair: Jon Michael Jachimowicz	Chair: Christoph Ungemach
	Bayesian Probabilistic Reasoning in a Category Learning Task. Marus Lindskog, Anders Winman, & Peter Juslin	Fuzzy Multi Criteria Decision Making Methods in Energy Management: A Literature Review. Melike Erdogan & Ihsan Kaya	Honesty speaks a second language. Yoella Bereby-Meyer	Has something happened? Monitoring streams of data for signs of change. Nigel Harvey, Matt Twyman, & Maarten Speekenbrink	Probability neglect in risky choice: the role of numeracy, cognitive reflection and happiness. Andrea Louise Taylor & Rob Ranyard	Text messages reduce 'credit card effect'. Jon Michael Jachimowicz	Attribute Translations as a Choice Architecture Tool. Christoph Ungemach, Adrian R. Camilleri, Richard P. Larrick, Elke Weber, & Eric J. Johnson
	Better the devil you don't know: preference for predictable or uncertain probabilities and the risk of failure. Peter Ayton, Eugenio Alberdi, Lorenzo Strigini, & David Wright	Learning well but choosing poorly: Harsh choice environments that discourage good choices can still permit successful learning. Tim Rakow & Louise Wright	How comparative feedback can "nudge" consumers to reduce energy consumption. Michele Graffeo, Ilana Ritov, & Nicolao Bonini	Pitting Intuitive and Analytical Thinking Against Each Other: The Effect of Complexity Level and Presentation Format of Numerical Evaluation. Zohar Rusou, Dan Zakay, & Marius Usher	Regret and Disappointment in the Trust Game. Luis F. Martinez & Marcel Zeelenberg	The Effects of Memory and Motivation on Reference Price Formation. Jolie M. Martin, Tomas Lejarraga, Cleotilde Gonzalez	Designing an Electricity Bill to Motivate Savings: The Effect of Format on Responses to Electricity Use Information. Casey Inez Canfield, Wändi Bruine de Bruin, & Gabrielle Wong-Parodi
1.30pm-3.30pm	Causal structure as an intervention to overcome base rate neglect: same old problems? Simon McNair & Aidan Feeney	Intuitive choices intensify emotional experiences: An overlooked reason for the "intuition bias"? Geir Kirkeboen	Misjudging the impact of advice: How advisors systematically misperceive their influence. Christina A. Rader	Process Evidence for a Causal Model Theory of Judgment. Abigail B. Sussman & Matthew LaMonaca; presented by Daniel M. Oppenheimer	Regret Aversion, Accountability and Decision Justification in the Decoy Effect. Terry Connolly, Jochen Reb, & Edgar Kausel	De-Biasing investors' volatility inadaptability. Christine Kaufmann	Don't Tell Me What to Do! Consumer Reviews Are Valued Less for Experiential Purchases. Hengchen Dai, Cindy Chan, & Cassie Mogilner
	Certain, possible, and improbable outcomes: A new approach to verbal probabilities. Karl Halvor Teigen & Marie Juanchich	Best-in-Hotspot: Choice Architecture to Attract Patients to High Quality Hospitals. Barbara Fasolo & Elena Reutskaja	Kind, selfish, competing, or confused? Unraveling contribution decisions in public good games. Jan K. Woike & Sebastian Hafenbrädl	What are the chances of winning? Exploring the ecology and psychology of competitions. Emre Soyer & Robin Hogarth	The impact of affective and cognitive evaluations on pregnant women's decision about prenatal screening. Danielle Timmermans	Do the Wise Get Richer? The Impact of Financial Wisdom on Financial Well-Being. Hansjörg Neth & Mirta Galesic	How Awareness and Valuation of the Future Jointly Shape People's Financial Decisions. Daniel M. Bartels, Oleg Urminsky, & Shane Frederick
	Ecologically Rational Choice and the Structure of the Environment. Tim Pleskac	Partially Observable States and the Tendency to Rely on Small Samples. Ori Plonsky & Ido Erev	Sharing Information is not enough: Repetition Biases in Hidden-Profile Situations. Klaus Fiedler	Information Sampling and the Evaluative Advantage of Novel Alternatives. Gael Le Mens, Yaakov Kareev, & Judith Avrahami	Age-Differences in Affective and Deliberative Decision - Making. Joshua Weller, Bernd Figner, & Natalie Denburg	Experts' perspective on consumers' perception and decision making in retail finance. Inga Jonaityte	Suggest or Sway? Effects of Online Recommendations on Consumer Behavior. Gediminas Adomavicius, Jesse Bockstedt, Shawn Curley, & Jingjing Zhang
		The Probability Paradox. Eduard Brandstätter	Social Preferences in the Lab and the Field. Daniel Navarro-Martinez, Paul Dolan, & Matteo Galizzi	Strategic Optimism: desired outcomes elicit wishful thinking, but only when they are self-relevant and highly likely. Zafir Bloch-David, Yoav Ganzach, Orit Tykocinski, & Yaniv Shani	Risk and Responsibility. Darren Duxbury & Barbara Summers	A reminder of an organizations pro-social activities increases financial risk-taking of organization members. Maria Blekher	
3.30pm-4.00pm	Coffee Break						

			Monday 19th				
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401	Q-402
	Process Tracing Methods	Choice (II)	Symposium I: A cross-national study of uncertainty and perceptions of Global Climate Change Chair: David V. Budescu Discussants: Thomas S. Wallsten & Wandi Bruine de Bruin	Symposium II: Multiple numeric competencies in judgment and decision processes Chair: Ellen Peters Discussants: Ellen Peters & Valerie Reyna	Symposium III: Evaluations from experience Chair: Tim Rakow, Eldad Yechiam, & Ido Erev Discussant: Ido Erev	Symposium IV: Judgmental Biases in Law Chair and Discussant: Amos Schurr	Symposium V: Causal Judgment, Responsibility and Moral Psychology Chair: Denis Hilton Discussant: Barbara Spellman
	Chair: Frank Renkewitz	Chair: Manel Baucells					
	An eye-tracking analysis of cognitive processes in memory-based quantitative judgment. Frank Renkewitz & René Schlegelmilch	Testing a new odd theoretical prediction: Sunk-cost effects and the flat-rate bias are negatively correlated. Manel Baucells & Giampaolo Viglia	The 2012 cross-national study of uncertainty and perceptions of Global Climate Change. D. V. Budescu, Han-Hui Por, M. Balassiano, I. Barbopoulos, S.	Numeracy and shared decision making between doctors and their patients. Garcia-Retamero, Cokely, Wicki, & Hanson	Loss aversion as response distortion: The complaint bias. Telpaz, Yechiam, & Hochman	Affirmative Action and other Group Tradeoff Policies: Identifiability of the Adversely Affected People. Ilana Ritov & Eyal Zamir	A counterfactual model of responsibility attributions in groups. Tobin Gerstenberg
	Better Than Expected But Surprisingly Unrelated: Short- and Long-Term Stability of Information Search and Choice. Thomas Scherndl & Anton Kühberger	Approximating rationality under incomplete information: Adaptive inference mechanisms for missing cue values. Marc Jekel, Andreas Glöckner, Arndt Bröder, & Viktoriya Maydych	Broomell, J. Fuller, C. Gonzalez Vallejo, L. Hadar, A. Hansla, E. Hoelzl, Z. Hichy, M. Juanchich, A. Maydeu-Olivares, K. Nakamura, D. Önköl, M. Sirota, M. Smithson, J. Sokolowska, G. Villejoubert, & C.	The lure of beauty: People choose representations of statistical information based on attractiveness, not comprehensibility. Gaissmaier & Garcia-Retamero	The endowment effect from experience: Sellers and buyers differ in how they search for information. Pachur & Scheibehenne	A Person-Organization Discontinuity in Contract Perception: Why Corporations can Get Away with Breaking Contracts but Individuals Cannot. Uriel Haran	Facts, events and outcomes: How event description and causal structure constrain counterfactual reasoning and judgments of actual cause. Denis Hilton & Christophe Schmeitzler
	Response dynamics in social dilemmas: Dissecting the influence of social norms, fear, and greed. Pascal J. Kieslich, Benjamin E. Hilbig, & Felix Henninger	Intransitive cycles and rational choice. Johannes Müller-Trede, Shlomi Sher, & Craig R.M. McKenzie	Predicting mitigation action: A cross-national analysis. Stephen Broomell, David V. Budescu, & Han-Hui Por.	Predicting biases in highly numerate samples. Cokely, Ghazal & Garcia-Retamero	Forgetting the past: The interplay between experience and memory span in subjective valuation. Ashby & Rakow	Do Lawyers Really Believe Their Own Hype and Should They? A Natural Experiment. Zev J. Eigen & Yair Listokin	Moral Obligations in the Global Village: How Do Availability and Location of Means Influence Judgments of Helping Obligation? Jonas Nagel & Michael Waldmann
	Predicting your choice before your choose: Eye-tracking based analysis of temporal decision dynamics. Vinod Venkatraman & John W. Payne	Do preference reversals only occur in the absence of preference? George David Farmer, Paul Warren, Andrew Howes, Wael El-Dereby, & Shahd Majdub	Mixed beta GLMs for analyzing laypersons' numerical translations of IPCC probability expressions. Michael Smithson	Objective, subjective, and approximate number abilities in judgments and decisions. Peters & Bjälkebring	Lazy or Eager: Intuitive Statistics on Sequentially Presented Data. Lindskog, Juslin, & Winman	Expertise and Accountability as Efficient Vehicles for Attenuating Judgmental Biases and Increasing Law Obedience. Amos Schurr, Omer Dekel, & Simone Moran	Causal Deviance and Culpable Control. Mark D. Alicke & David Rose
	Psychological accuracy of risky choice models based on option- vs. dimension-wise evaluations. Joanna Sokolowska	Dynamic Consistency in Collective Decisions. Enrico Diecidue	How much will the sea level rise? It depends on the format of uncertainty communication. Miroslav Sirota & Marie Juanchich	I hate (love) math: The motivating and emotional force of subjective numeracy in numerical tasks. Bjälkebring & Peters	The ExCON: A Model of Probability Knowledge and Choice in Decisions from Experience. Camilleri, Hawkins, Newell, & Brown	Priming Ideology? Electoral Cycles Without Electoral Incentives Among Elite U.S. Judges. Daniel L. Chen & Carlos Berdejo	
	How we play games: Eye movements and decision making in prisoner's dilemma, stag hunt, and hawk-dove games. Neil Stewart, Simon Gaechter, & Takao Noguchi	Known Unknowns in Judgment and Choice. Daniel J. Walters, Craig Fox, Philip M. Fernbach, & Steven A. Sloman					
6.00pm-7.00pm	EADM General Assembly (Aula magna)						

Monday 19th

Parallel Sessions

10.30am–12.30pm

Uncertainty and Probability (I) Q-101

Chair: David Rothschild

1. A Competition among New Methods for Eliciting Probability Distributions.

David Rothschild, Microsoft Research

Daniel G. Goldstein, Microsoft Research

Florian Teschner, Karlsruhe Institute of Technology (KIT)

This paper tests eight methods for eliciting probability distributions from laypeople. Traditional methods have typically elicited distributions by asking for the likelihood of an outcome in a given range and many academic researchers have adopted this practice in survey experiments as well as professional pollsters in various domains. We compare this traditional method with seven graphically-oriented interfaces. The "balls and buckets" interface asks users to fill up buckets that represent each range with 100 balls. A series of new interfaces we propose asks users to specify, click, and drag up to six data points that define polygon-shaped probability distributions with little time and effort. In various, randomly-assigned conditions we test six progressively complex interfaces that range from a simple point-estimate to a multi-sided polygon density. The different graphical interfaces have varying strengths in eliciting probability distributions from laypeople, but they all dominate the traditional text-based elicitations. The most complicated of the graphical interfaces takes less time than the traditional method, but produces more accurate results on both the individual and aggregate-level. Learning lowers the effort level for the more complex graphically oriented interfaces, further distancing their efficiency relative to the traditional method.

2. A Direct Method for Measuring Discounting of Monetary Profiles.

Peter Wakker, Erasmus University Rotterdam, Netherlands

Han Bleichrodt, Erasmus University Rotterdam, Netherlands

Arthur Attema, Erasmus University Rotterdam, Netherlands

Zhenxing Huang, Erasmus University Rotterdam, Netherlands

Yu Gao, Erasmus University Rotterdam, Netherlands

Time discounting of one-time monetary outcomes has been extensively investigated during the last decades, but there have been no attempts to measure the discounting of flows of outcomes (e.g. salary, pension). We propose a new method, the Direct Method (DM), that (1) can measure time preferences over flow outcomes; (2) thus provides an alternative way to measure discounting and time inconsistencies. A big advantage of the DM is that it needs no measurement of or assumption about utility, whereas this is essential in traditional methods. Moreover, the DM is incentive-compatible, improving subjects' motivation. We compared the DM and the traditional method in an experiment. The DM works better for measuring complex (and realistic!) stimuli, requiring considerably fewer questions because it can skip utility measurement.

3. Acting informatively: How people learn causal structure through sequences of interventions.

Neil Bramley, University College London

David Lagnado, University College London

Maarten Speekenbrink, University College London

Active learning is central to how people establish and update their beliefs about the causal structure of their environment. Despite this, existing psychological studies on active causal learning are limited and highly constrained: focusing only on single interventions, in deterministic environments or restricted hypothesis spaces. In this talk we describe two experiments where participants were incentivised to infer the structure of probabilistic causal networks through the free selection of multiple interventions. Participants' sequences of intervention choices and online structure judgements are measured against those of an efficient Bayesian learner, which integrates information perfectly and intervenes to maximise expected utility. Successful participants were systematic in their intervention strategies and learned

effectively, but chose markedly different intervention sequences to those of a Bayesian learner. Several heuristic intervention-attribution strategies were identified and fitted to individual participant's data. Overall, we find evidence suggesting that causal structure learning is achieved by the iteration of simple action-selection and causal-attribution mechanisms.

4. Ambiguity Attitudes over Time.

Yuanyuan Liu & Ayse Onculer, ESSEC Business School

Previous research reports that consumers are generally ambiguity averse for high probabilities but they are ambiguity seeking for low probabilities. Since risky and ambiguous prospects are usually unresolved until some future date (the success of new product investments, mergers, consumer products purchased for the home, etc.), the current study examines the impact of time on ambiguity preferences. Our experimental results show a robust effect of time: temporal distance mitigates ambiguity-seeking behavior at low probabilities and ambiguity-aversion at high probabilities. This effect is consistent across different probabilities, ambiguity levels (variance around a fixed probability), temporal distances and methods in eliciting ambiguity attitudes (choice task and probability-ambiguity tradeoff task). We propose two underlying processes that may produce such an effect: (1) temporal distance shifts individuals' focus from feasibility (probabilities) to desirability (outcomes), leading to indifference towards ambiguous and unambiguous prospects with comparable outcomes, and (2) Temporal changes in anticipated disappointment (elation) impact ambiguity preferences. Resolution in the present, with its immediate gains and losses, heightens anticipated emotions that encourage ambiguity aversion for higher probabilities and ambiguity seeking for lower probabilities. However, future resolution reduces reliance on anticipated emotional responses and thereby tempers the extremity of ambiguity preferences. The implication is that present-oriented decision frames inflate ambiguity preferences by stimulating affect and/or making people focus on the probability information of a prospect. Decision-makers may control for these tendencies by enlisting more future-oriented frames.

5. Are people optimistic in their belief updating? Formal analysis and new evidence suggests not.

Adam J. L. Harris, University College London

Punit Shah, University of Surrey

Ulrike Hahn, Birkbeck College

Caroline Catmur, University of Surrey

Geoffrey Bird, King's College London

Received academic wisdom holds that human judgment is characterized by unrealistic optimism, the tendency to underestimate the likelihood of negative events and overestimate the likelihood of positive events. Author (2011) recently raised question marks over the reliability of these conclusions, demonstrating that the methods most frequently used could generate optimistic *seeming* responses from a population of rational, unbiased agents. What optimism research therefore requires is a new, better, test of optimism. A recent series of high profile papers have provided evidence suggesting that people incorporate new information regarding their risk of experiencing future negative events in a biased fashion. Specifically, people update their risk estimates more in response to desirable information (information that suggests that they are less at risk than they had previously thought) than undesirable information. These findings are of considerable import for two reasons. Firstly, they tip the balance of evidence in favor of a general optimistic bias in human judgment, despite Harris and Hahn's critiques of previous methods. Secondly, they provide a mechanism through which such a bias is obtained: selective belief updating. We provide a formal critique of the methodology used in these studies ('the update method'). We subsequently present the results of two studies that control and correct for the identified flaws, concluding that there is no evidence for a general optimistic belief updating bias.

6. Are probability judgments made at an early stage better or worse than those made at a later stage? Two studies of how well betting experts forecast football results.

Patric Andersson, Stockholm School of Economics

Håkan Nilsson, Uppsala University

Gustaf Törngren, Stockholm University

This paper addresses the research question: Do experts become more or less confident and accurate when making probabilistic forecasts at a point that is close to the predicted events rather than distant? Prior research suggests that more information tends to make people (including experts) more confident but not necessarily more accurate. When predicting the outcome of an event (e.g., the football match Barcelona vs. Espanyol), forecasters can expect to access a greater number of allegedly predictive cues the closer in time they are to this event (e.g., the day rather than the month before kick-off). Prior research also indicates that probability judgment of experts is generally poor but may be adequate under certain conditions. Experience in using probabilistic information and receiving immediate feedback are factors associated with accurate expert judgment. Arguably, bettors (= people who regularly bet on the outcome of sports events) face such conditions. The paper is based on data from two studies involving 8,856 and 3,540 probabilistic forecasts. Study 1 used a within-subjects design, whereby 41 bettors predicted the outcome of 24 matches in the Euro 2012 at three different occasions. Study 2 used a between-subjects design involving 59 participants. Half of them predicted the outcome of 20 Premier League matches about one month earlier than the other half did. On the whole, the two studies showed consistent results. The different occasions of the predictions had similar levels of confidence and accuracy in probability judgments. On average, the accuracy of the judgments of the participants was deemed to be adequate. The findings are discussed with respect to the role of task characteristics.

Theoretical Perspectives Q-102

Chair: Henrik Olsson

1. A unified framework for analyzing and improving individual and group judgment.

Henrik Olsson, Max Planck, Institute for Human Development

What determines the performance of group judgment and how to improve it? After decades of research, the social sciences still lack an integrative theoretical framework that could help answering these questions. I propose that connecting group decision making research with insights from machine learning and statistical theory could help us develop such a framework and answer these questions. The framework, based on decomposing the prediction error of group judgment into bias, variance, and covariance, makes it possible to determine when and why groups perform better than individuals and to devise new ways of improving the accuracy of group judgment. I use computer simulations to estimate the bias-variance profiles of cue- and exemplar-based strategies and the bias-variance-covariance profiles for groups of these strategies. The results show that exemplar-based strategies benefit the most from averaging, due to lower bias and higher variance compared to cue-based strategies. The performance of exemplar-based strategies is affected by the specifics of the similarity function and the rate at which similarity declines with distance. The insights from the bias-variance-covariance framework tell us that the success of group judgment depends on strategies the individual members are using (e.g., low or high variance strategies), what information they are focusing on (e.g., how much overlap there is between the information they are using), and how the individual assessments are used to reach a group decision (e.g., averaging or relying on the perceived best member). Using the bias-variance-covariance framework to recognize and analyze these aspects of group judgments can help us understand what factors contribute to successful group decisions in a variety of real world contexts.

2. Multi-alternative Decision by Sampling: toward an empirically supported process model.

Takao Noguchi, University of Warwick

Neil Stewart, University of Warwick

Adam Sanborn, University of Warwick

The attraction, compromise, and similarity effects in multi-alternative choice demonstrate that the value of an alternative is not independent of the other alternatives in the choice set. Several computational models have been proposed to account for these context effects (e.g. Bhatia, in press; Roe, Busemeyer, & Townsend, 2001; Usher & McClelland, 2001). We examined these models using eye-movement data. The pattern of eye-movement is not consistent with the decision processes claimed by those models. Instead, the results indicate that people develop a preference through a series of pairwise comparisons of single attribute values, and that similar alternatives are more frequently compared against each other.

This decision process matches the framework of the decision by sampling (DbS) model (Stewart, Chater, & Brown, 2006). But to explain the attraction, compromise and similarity effects with the DbS mechanism, one needs to assume one additional process, where a decision maker may dismiss the comparison when the difference between compared alternatives is relatively small. The difference is evaluated as a ratio of two attribute values, and when this ratio is small, the decision maker may think the difference is not meaningful (Tversky & Kahneman, 1981).

Based on these findings, we propose a new process model of multi-alternative decision making: a decision maker stochastically selects two alternatives to compare, randomly attends one attribute dimension, and develop a preference for the alternative which the comparison favours. In doing so, the decision maker is more likely to compare similar alternatives but tends to dismiss small differences. This model provides a simpler explanation of the attraction, compromise and similarity effects than the existing models.

3. Beyond Dual Processes in Framing and Temporal Discounting: A Fuzzy-Trace Theory Account of Risky Decision Making.

Valerie F. Reyna, Evan A. Wilhelms, Rebecca B. Weldon, Priscila G. Brust Renck, & Jonathan C. Corbin, Cornell University, United States

We examined relations among intuitive processes (i.e., gist), temporal discounting, sensation

seeking (reward sensitivity), and risk-taking in health domains such as alcohol use and food choices. Fuzzy-trace theory (FTT) predicts that individuals' decisions will be affected by a combination of reward sensitivity (a neurobiological construct related to increased activity in the dopaminergic reward pathways in the brain), inhibitory mechanisms which have been located in prefrontal areas of the brain, and individuals' mental representations of the decision problems. If these principles are true, biases should increase when gist processing is relied on relative to verbatim processing. In the present study, subjects completed a series of framing and temporal discounting tasks in a full-factorial mixed design, as well as a series of individual difference measures that measure constructs such as sensation seeking (reward sensitivity) and cognitive reflection (inhibition). Subjects showed standard framing effects regardless of CRT score if expected values are equal, however verbatim calculation will trump the gist in those with high CRT scores when expected values are unequal. Temporal discounting, as measured by a new scale, was associated with both the approach-based mechanism that was captured in sensation seeking and risk-taking in gains, but also was associated with the lack of inhibition that the CRT measures. Consistent with FTT, risk-taking was predicted by both reward sensitivity and gist mental representations. These results are consistent with a theoretical mechanism in which the perception of the gist of choices, as well as individual differences in reward salience and neurobiological responsiveness, each account for unique variance in predicting risk-taking.

4. Reconciling irrational and adaptive views of heuristics.

Paula Parpart, University College London

Matt Jones, University of Colorado

Bradley C. Love, University College London

There have been two very distinct notions of heuristics, namely Kahneman and Tversky's (1974) concept of heuristics as biased approximations to rational inference, and Gigerenzer et al.'s (1999) idea of smart and adaptive heuristics. Despite the apparent conceptual differences between them, we provide evidence that heuristics can be seen as approximating a rational account which is at its core adaptive to the environment.

Heuristics are commonly depicted as strategies that ignore a large part of the information. They are often contrasted with more "rational" accounts which do in fact weigh and integrate across information. Notably, Gigerenzer and colleagues were able to show that in some cases simple heuristics (e.g., take-the-best) could even outperform multiple regression. However, a common problem with linear regression is that it estimates weights from noisy data which leads to

overfitting. In a large simulation, we showed that a regularized regression model (from machine learning) with a penalty noise parameter could outperform both heuristics and multiple regression in a number of environments. More specifically, we found that the penalized regression with an L^2 -norm could be approximated by *tallying*, whereas the L^1 -norm could be approximated by the *take-the-best* heuristic. Results indicate that the penalized regression paints heuristics and linear regression at extreme ends of the spectrum of decision strategies, treating them both as special cases of the model. The research implies a common rational basis for heuristics and integrative strategies, suggesting that the relation need not be adversarial. Finally, results imply that heuristics can be seen as approximating rational inference providing an explanation for why heuristics work.

5. The Combined Connectedness Principle: How Psychological Connectedness Guides Preferences.

Henry Montgomery & William Montgomery, Uppsala University, Sweden

The British philosopher Derek Parfit (1984) introduced the term "psychological connectedness" to denote the connections (e. g., in terms of overlapping beliefs, values, and goals) that keep personal identity together. We propose a dual role for psychological connectedness in people's preferences - the combined connectedness principle. We assume that a person's preference for an option X can be predicted from a weighted average of the extent to which X implies that connectedness is expected to be preserved (connectedness preservation) and the amount of connectedness discounted well-being that X is expected to lead to (connectedness value discounting). In three studies participants were presented with hypothetical events that might occur in their lives and were asked to rate them with respect to well-being, connectedness, and the extent to which they wanted or did not want them to occur. In all three studies the combined connectedness principle accounted for more than 90 % of the variance across events of the mean preference ratings calculated for each event. Both connectedness components contributed significantly,, but with a higher contribution of connectedness discounted well-being than of connectedness preservation. Using ratings of moral quality (Study 1) did not improve the fit. Adding a hypothetical large sum of money (Studies 2 and 3) did not change connectedness preservation, but changed expected well-being weighted by the extent to which connectedness was rated to be preserved. The present results yield preliminary support for a dual role of psychological connectedness in preferences. The combined connectedness principle implies a specification and modification of the idea that preferences are or (should be) guided by utility maximization.

Social Aspects in JDM (I) Q-103

Chair: Mike Yeomans

1. Asking Too Much? Measuring the Collateral Costs of Fundraising.

Mike Yeomans, University of Chicago

Omar Al-Ubaydli, George Mason University

Fundraising solicitations are a critical tool to support charities, non-profits, and other public goods. In most academic studies these fundraising drives are measured solely to the measured in terms of the amount of funds raised, and many theories have been developed to explain why people give. These theories tend to be written from the perspective of the fundraiser, trying to maximize contributions, though recent work has provided evidence for a "social pressure" account of the costs that fundraising imposes.

We report results from a natural field experiment that offers a unique perspective on the collateral costs of fundraising. Our data comes from a non-profit firm that decided to ask their volunteers to make monetary contributions, in addition to their ongoing hours (as tax preparers for low-income households). This provides an opportunity to observe potential side-effects from the imposition of a fundraising drive.

We randomly assigned volunteers to be solicited at different times during the tax season, allowing between- and within-subjects comparisons. Solicitation resulted in an 8-12% decrease in volunteer hours donated during two distinct solicitation waves. We also varied the message used in the solicitation and find some evidence supporting the "identifiability effect". However, this increase in donations is not matched by an increase in the hours donated.

We interpret this result as evidence of collateral costs imposed by the fundraising drive. Simple substitution effects are too small to account for the data. These results inform theories of giving, and have particular consequences for firms – organizations that rely on unsolicited appeals should also consider whether those costs might be passed back to the firm.

2. Benefiting from harm: When harmless actions are judged to be morally blameworthy.

Yoel Inbar, Tilburg University

David Pizarro, Cornell University

Dominant theories of moral blame require an individual to have caused or intended harm. However, across four studies we demonstrate cases where no harm is caused or intended, yet individuals are nonetheless deemed worthy of blame. Specifically, individuals are judged to be blameworthy when they engage in actions that enable them to benefit from another's misfortune (for example, betting that a company's stock will decline or that a natural disaster will occur). We present evidence suggesting that perceptions of the actor's wicked desires are responsible for this phenomenon. We argue that these results are consistent with a growing literature demonstrating that moral judgments are often the product of evaluations of character in addition to evaluations of acts.

3. Competitive games of timing: How competition affects information search and choice.

Nathaniel David Phillips, Max Planck Institute for Human Development

Ralph Hertwig, Max Planck Institute for Human Development

Yaakov Kareev, The Hebrew University of Jerusalem

Judith Avrahami, The Hebrew University of Jerusalem

Individuals must actively search for information in order to make an informed choice between uncertain options. Extant research on so called "decisions-from-experience" has focused on how solitary decision makers behave. However, many choice situations occur at the presence of other choosers who can consume options during search. How long do (and should) people search when competitors are present? We investigated both questions in a modified version of the decisions-from-experience paradigm that allows competitive players to play together wherein each choice renders the chosen option unavailable to the competitor. Empirically, we observe that competition drastically reduces search prior to choice. Moreover, we find both empirically and computationally that this minimal search is adaptive when one is uncertain about how long one's competitors intend to explore before staking their claim to an option.

4. Does vicarious learning help to escape the trap of competition in a social dilemma game?

Guillaume Blanc, University of Lausanne

Ulrich Hoffrage, University of Lausanne

Jan Woike, Max Planck Institute for Human Development

Sebastian Hafenbraedl, University of Lausanne

A social dilemma appears when self-interested motives are in conflict with group interests. In an experimental version of this dilemma, participants can allocate an endowment between a personal project and a public good project. The setting is such that investing in their personal project (defect) maximizes the participants' own payoff, although should they all jointly invest in the public good project (cooperate), they would receive an even higher payoff—hence the dilemma. Participants are randomly matched in groups of four and play ten rounds of the game in a row. In the "neutral" condition (NC), each participant is told his/her performance at the end of each round, with no reference to the others' payoffs. In the "ranking" condition (RC), each participant is told his/her performance, relative to others, along with detailed information on the players' decisions and payoffs. In a previous series of studies, Woike and Hafenbraedl found that the ranking drives players into a competitive mindset, reducing their inclination to cooperate. The present study addresses the question of whether publicly informing participants about this effect ("the trap of competition") enables them to change their mindset and to maintain a high level of cooperation despite having their performance ranked. Specifically, after participants played two series of ten rounds each (one NC and one RC, within-subjects, order counterbalanced), the average payoffs in the two conditions are made public, allowing participants to ponder about the effects of destructive competition. They are then again randomly matched into groups of four, and play a last series of ten rounds of the game in the RC. Findings (which are not yet available) will be discussed in terms of effectiveness of vicarious learning.

5. The justice spray: The role of oxytocin in social norm enforcement.

Mirre Stallen^{1,2}, Filippo Rossi³, Amber Heijne², Ale Smidts¹, Carsten K.W. de Dreu⁴ & Alan G. Sanfey²*

¹Rotterdam School of Management, Erasmus University Rotterdam, the Netherlands; ²Donders Institute for Brain, Cognition and Behaviour, the Netherlands; ³University of Arizona, Tuscon, USA; ⁴University of Amsterdam, the Netherlands.

The hormone oxytocin has long been considered primarily important for pro-social behavior. However, recent studies are beginning to suggest that oxytocin does not necessarily lead to indiscriminately pro-social behavior, but rather that it may play a broader role in social behavior. The aim of this study was to explore the possible effects of oxytocin on social norm enforcement. If oxytocin does indeed play a key part in the promotion of social behavior in general, then does administration of oxytocin foster the choice to punish social norm violators? And might oxytocin lead to a greater willingness to compensate victims of social norm violations? To investigate the role of oxytocin in social norm enforcement, we conducted a between-subject, double-blind, placebo-controlled, experiment in which participants played three versions of a newly developed monetary game, named 'The Justice Game'. These versions were: a second-party punishment game, a third-party punishment game and a third-party compensation game. Results demonstrated that oxytocin did indeed significantly increase sensitivity to social norm violations, specifically, that participants in the oxytocin group showed a greater willingness to administer corrective punishments to those who violated a social norm than those in the placebo group. This effect was present in both of the punishment games, demonstrating that the effects of oxytocin on social norm enforcement extend into the domain of altruistic punishment. Oxytocin did not affect the willingness to compensate victims of social norm violation. Together, our findings support the hypothesis that oxytocin's effects on pro-social behavior are context-dependent.

6. The Case of the "Appropriate Adult" in Advising and Self-Other Decision Making.

Mandeep K. Dhami, University of Surrey

Rocio Garcia-Retamero, University of Granada

Not all people can make decisions for themselves, and they may need advice from others. In the UK, vulnerable suspects such as juveniles have the right to an "Appropriate Adult" (AA) during police questioning. AAs receive guidance on their role in a short and long form (the latter on request). Research shows that AAs may be useful in some ways, but not others. JDM research also suggests that people might not always be good at deciding for others. The main aims were to examine the effect of amount of information on the role of the AA, and the perspective of the decision-maker, on advising and decision-making for vulnerable suspects. Participants were 30 male juveniles, and 90 adults. They read a scenario describing a juvenile and AA at the police station, and some police compliance and non-compliance with legal policies. Perspective was

manipulated by describing "you" for youth and "Bill" for adults. Information on role was manipulated by providing the long or short version of the guidance (to adults only), or no information (to youth and adults). Participants rated to what extent they would e.g., request legal representation. A one-way ANOVA showed significant effects of information on role. Post hoc tests revealed that adults with no information performed worse than those with full information. There was little difference between those with no and partial information, and those with full information performed the best. A one-way ANOVA also showed significant effects of perspective. Although youth were significantly more likely than adults to ask for legal representation, and less likely to confess, they were not as good at protecting themselves in other ways. Our findings contribute to work on advising and self-other decision-making, and have practical implications.

Judgement and Intuition (I) Q-301

Chair: Marta Stragà

1. Do you want to see the sequel? Global judgments vs. episodic recollection in the prediction of future intentions.

Marta Stragà, Fabio Del Missier, Francesco Marcatto, Donatella Ferrante, University of Trieste, Italy

The aim of the present study was to investigate the memory bases of affective evaluations that determine behavioral intentions about future hedonic experiences. Previous studies made not clear whether the specific memory processes supporting intentions about the future involve global judgments (general affective evaluations formed on-line; Hastie & Park, 1986) or judgments derived from the episodic recollection of the past (e.g. Robinson & Clore, 2002). Adapting an existing correlational paradigm (Wirtz et al., 2003), applied to the experience of watching a movie, we comparatively tested the influence of global retrospective evaluations vs. episodic-derived evaluations on future intentions (e.g., watching the movie sequel). Retrospective evaluations were collected one week after the experience. The influence of prior expectancies and on-line evaluation of the experience was also taken into account. Path analysis showed that a model in which intentions were selectively predicted by global retrospective evaluations accounted for a greater amount of variance ($R^2 = .72$ vs. $R^2 = .24$) and presented much better indices of fit than a model in which intentions were selectively predicted by

episodic-derived evaluations. This indicates that global retrospective evaluations are stronger predictors of future intentions than episodic-derived evaluations, even when episodic information is easily available (as shown by the recall data). The observation that global retrospective evaluations are unrelated to episodic-derived evaluations while being affected by expectancies and on-line evaluations suggests that an overall judgment, probably expressed during the hedonic experience, was adjusted and used as a basis in the intention formation process.

2. Why is your neighbor's grass greener – or is it?

Orit Tykocinski, Interdisciplinary Center (IDC), Herzliya

The idiom "your neighbor's grass is always greener" captures the belief that other people's circumstances or possessions are superior to our own. When people are asked to explain the meaning of this idiom they tend to fault human nature and implicate jealousy, envy, and discontent. We argue instead that sometimes the "greener grass" perception may simply reflect the effect of our relatively limited exposure to others' possessions, combined with the tendency to neglect sample-size when constructing statistical inferences concerning the characteristics of the population from which the sample was drawn. In two experiments this hypothesis was tested by manipulating the degree of exposure to one's own versus another's possessions. In the third study, the social context was omitted. As expected, we found that although people's impressions were sensitive to the outcomes they observed they were not sufficiently sensitive to the number of observations, and that this tendency is independent of any social context. Thus we conclude that your neighbor's grass may seem greener, simply because naturally you see less of it. We discuss the implications of our findings vis-à-vis the endowment effect.

3. Hindsight Bias Affects Creativity Judgments.

Marieke Roskes, Ben Gurion University of the Negev

Daniël J. Sligte, University of Amsterdam

Matthijs Baas, University of Amsterdam

Bernard A. Nijstad, University of Groningen

Carsten K.W. De Dreu, University of Amsterdam

Creativity judgments play an important role in determining which patents are awarded, which movies win prizes, which restaurants receive Michelin stars, and which business start-ups and research proposals are funded. Building on the hindsight bias literature, we propose that ideas which are generated through a flexible and associative way of thinking or sudden insights are surprising and seem to come 'out of the blue'. When the exact same ideas are generated through a persistent and systematic way of thinking, it is easier to follow the reasoning and understand how someone came up with these ideas. In turn, this may make the idea seem more obvious and unsurprising, and therefore less creative. In three experiments we find support for this "knew-it-all-along" effect in creativity judgments: The exact same products and ideas were consistently judged as less creative when they were generated through a systematic rather than flexible process.

4. Improving estimation through active feedback.

Bonnie C. Wintle, Australian Centre of Excellence for Risk Analysis (ACERA), Environmental Science*

Fiona Fidler, Australian Centre of Excellence for Risk Analysis (ACERA), Environmental Science
Peter A. Vesk, Centre of Excellence for Environmental Decisions (CEED)

Joslin Moore, Centre of Excellence for Environmental Decisions (CEED)

Feedback about judgement accuracy is crucial for improving estimation, yet is often not given because it is difficult to obtain 'true values' to learn from. Often, the only information we can access is other people's estimates of the same thing. Group average estimates tend to be remarkably accurate. By extension, receiving feedback about group averages may improve the estimation performance of individuals.

In Experiment 1, we tested whether feedback using group averages might improve abundance estimates as much as feedback using true values. However, not all feedback approaches are effective. In Experiment 2, we compared two feedback formats for presenting information about group estimates of abundance. Both experiments used interval estimation to quantify uncertainty that is known to reduce overconfidence.

Experiment 1 showed that feedback about group averages improved performance (calibration and accuracy) almost as much as feedback about the truth, despite the fact that group averages were generally not close to true values. In contrast, group averages in Experiment 2 were remarkably close to true values, but the only participants who improved their estimates were

those who evaluated their own performance, using active calibration feedback.

Feedback reminds ecologists not to give over-precise estimates, and to appropriately reflect uncertainty. It improves calibration and accuracy of abundance estimates, and could reasonably improve estimates of other quantities. Drawing on the wisdom of crowds, group averages could be used as a proxy for true values in feedback procedures. However, the format for delivering feedback matters. Actively engaging participants by having them evaluate their own estimation performance appears critical to improving their subsequent judgements, compared with passive feedback.

5. Rational and still biased? How profit-maximizing can lead to biased judgments.

Max Ihmels, University of Heidelberg

Florian Kutzner, Warwick Business School

Biases are usually attributed to errors in information integration. The present work follows the idea that in some environments even perfect rationality (perfect information integration and perfect awareness for flaws of the samples) can lead to biases. The theoretical framework used is the experience sampling model (Denrell, 2005). It states that if information search is not only about accuracy, but also about the experienced outcomes (e.g. winning or losing money), sampling decisions about an alternative depend on the current impression of that alternative. Seemingly negative alternatives are sampled less. This leads to biased (i.e., too negative) judgments for alternatives that provide only selective feedback. If you combine such a selective feedback alternative with another alternative that always provides feedback (i.e., incidental information), you can create an interesting scenario in which biases should arise for the selective alternative but not for the incidental information alternative. The main goals of the present work were to investigate how people behave in such an asymmetric information scenario and whether they produce the biases that are predicted by a perfect expectancy-value maximizing strategy. We therefore conducted 3 studies in which we confronted participants with the asymmetric scenario described above and told them to try to maximize profit. As predicted by the model, participants showed biases in judgments and choices related to the selective feedback alternative. Compared to its true value, it was evaluated too negatively and chosen too infrequently. Our findings support alternative sampling-based explanations for different well-known phenomena such as increased liking for in-group members or the formation and persistence of stereotypes.

Emotions (I) Q-302

Chair: Yaniv Shani

1. Why Consumers Prefer Products Associated with Purchase Opportunities that were Missed over Purchase Opportunities that will be Missed.

Yaniv Shani, Tel Aviv University

Shai Danziger, Tel Aviv University

Yael Shani Feinstein, Tel Aviv University

Amitava Chattopadhyay, INSEAD

Marcel Zeelenberg, Tilburg University

Consumers must sometimes purchase a product knowing it will be discounted in the future or that it was discounted in the past. This is particularly true for purchases made at stores that offer and advertise frequent sales. We demonstrate that in 'must-buy' situations, consumers prefer a product that was previously discounted over a product that will be discounted. Relatedly, we demonstrate people often choose a product that eliminates the possibility that a future promotion opportunity will be available. Consumers engage in such prospectively driven choice when they expect future promotions will hinder their satisfaction with the product purchased in the 'must-buy' situation. Results indicate considering opportunities that will be missed evoke more regret and frustration than considering opportunities that were missed, and that consumers feel greater responsibility for missing a future opportunity. We suggest people experience opportunities that will be missed as more painful because they feel forced to abandon an attractive discount that is theoretically "still on the table" and that they would act upon under other circumstances. Being able to easily imagine a reality where they could postpone their purchase and benefit from the future promotion (Kahneman and Miller, 1986) increases peoples' sense of regret (Roese, 1994; Zeelenberg, 1999a, 1999b; Zeelenberg & Pieters, 2007), and rumination (Martin & Tesser, 1996). Consistent with these findings, preference for a product associated with an already missed opportunity was stronger for individuals high in need for cognitive closure and was weaker when the 'must-buy' item was utilized before the missed opportunity became available.

2. Bounded emotion. The psychophysics of affect and scope: Collapse of affect in donation and non-donation judgment tasks.

Daniel Västfjäl, Linköping University and Decision Research

William Hagman, Linköping University

Stephan Dickert, Linköping University and University of Vienna

Paul Slovic, Decision Research and University of Oregon

Research on giving to individuals has found that people tend to give more to one child than to many children (Singularity effect; Kogut & Ritov, 2005; Slovic, 2007). A main psychological mechanism proposed to account for this finding is compassion collapse suggesting that as the number of victims increase people lose their feelings of empathy, sympathy and compassion (Slovic, 2007). Earlier studies (Västfjäll et al. 2012, Kogut & Ritov, 2005) have indeed shown that ratings of affect tend to covary with, and mediate, the singularity effect. In this paper we present a series of studies aiming to investigate if compassion collapse is a general affective judgment phenomena. We use a paradigm where participants either view 1, 3, or 9 affect-inducing pictures) and then rate the intensity of their currently experienced emotion. Based on emotion theories we predicted that people would experience the strongest and most intense emotions to a single picture and as the number of pictures increased emotion intensity would drop. We conducted 10 laboratory studies in Sweden (with over 600 participants) and 2 web surveys using a representative US samples (over 500 participants) where we varied total duration/stimulus duration, picture valence, and presentation form (sequential/simultaneous). Across all studies we find strong support for affect collapse – the intensity of affect is strongest for a single affect-inducing stimulus and decrease as the number of stimuli increase. These findings suggest that our inability to feel for the many is an inherent property of our affective system and that this system share properties with our perceptual system.

3. How impulsivity and time affect inter-temporal decisions in normal and pathological gamblers.

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When making inter-temporal decisions (choices between outcomes occurring at different times), humans tend to prefer the soonest available option even if it is the smallest. However, preference reversals can be readily observed in certain conditions, leading decision-makers to choose the more delayed option. Though quantity of reward and time to wait undoubtedly matter, here we tested the hypothesis that the impulsivity of the decision-maker (as measured by dedicated questionnaires) and the emotional perception of the options (by recording electrodermal activity, EDA) play a role in biasing decisions towards more impatient choices. To this aim, two experiments were performed. In Experiment 1, we tested normal controls and pathological gamblers known to have deficits in impulse control, in an inter-temporal choice task. Results showed that gamblers scored very high on impulsivity questionnaires, and also chose a higher percentage of sooner-smaller options, whereas control did not exhibit an overall clear preference. Moreover, gamblers were faster at selecting a sooner-smaller option and discounted utility more rapidly over time. Importantly, regression analyses clarified that in addition to quantity of reward and time to wait, impulsivity played a significant role in biasing decisions towards small but more rapidly available rewards. In Experiment 2, by measuring an index of autonomic arousal (e.g. skin conductance) we tested the hypothesis and confirmed that smaller-sooner options are perceived as more emotional (in terms of increased arousal in EDA). We conclude by speculating on the need to incorporate impulsivity and emotional factors in models of inter-temporal choices.

4. Imagery, stress, and risk perception: The role of affect-laden imagery in risk perception.

Jakub Traczyk, Agata Sobkow, & Tomasz Zaleskiewicz, University of Social Sciences and Humanities, Wrocław

The aim of this study was to provide empirical support for a link between the intensity of mental imagery of risk consequences, affect and risk perception. Loewenstein, Weber, Hsee, & Welch (2001) proposed in their risk-as-feelings hypothesis that imagery-laden affect can influence our behavior in risky situations. However, little evidence has been collected so far to prove this

assumption. In three experiments we investigated how emotional reactions evoked by mental images of risk consequences influence risk perception.

In Experiment 1, we recorded EEG activity in occipital electrode sites of 17 participants who were instructed to imagine negative consequences of ten risky scenarios covering five risk domains. As we predicted, intensity of mental imagery measured through the attenuation of alpha band power registered in occipital sites correlated negatively with willingness to take risk but only among highly reactive participants (females). The opposite relationship was found in males. In Experiment 2 we found that more negative risk-related thoughts led to lower risk assessment and this relationship was fully mediated by stress level associated with risk images. Experiment 3 showed that imagining negative risk consequences was related to higher blood pressure and stronger self-reported stress. Moreover, declared stress associated with risky situations mediated the relationship between the intensity of mental representation of risk and risk perception.

Results of this project can be attributable to properties of the probability weighing function. Preliminary results of our follow-up studies showed that even controlling for probabilities and outcomes, affect-rich situations were judged as more attractive than neutral situations.

5. Issue specific emotionality: Beyond effects of utility.

Simone Moran, Ben Gurion University of the Negev

Ilana Ritov, Hebrew University

People often deal with multiple issues that vary with regard to emotional activation. Using negotiations as an example, we explore effects of independently varying issue emotionality and utility. In our first study we demonstrate that being emotionally charged about a particular issue does not spill over to other issues. Moreover, participants are more reluctant to concede on emotionally charged (vs. neutral) issues. Consequently, they obtain more efficient outcomes (larger pies) when the issues' relative utility and emotionality are matched vs. mismatched. In a second study we rule out the notion that varying issue emotionality essentially varies issue utility. Using a joint (compared to separate) evaluation procedure, we demonstrate that the observed effects of emotionally charged issues are not merely due to a corresponding increase in the highly emotional issues' subjective utility. In a third study, we explore peoples' preferences for receiving emotional vs. non-emotional pre-negotiation information about issues of varying utility. We find that when approaching negotiations, the probability of preferring emotional over non-emotional information is greater for high (vs. low) utility issues. This pattern of

preferences is congruent with the pattern of efficiency that we observed in study 1, where the most efficient outcomes were reached when higher utility issues were emotionally charged and lower utility issues were not.

6. Proud to Cooperate: The Effects of Pride versus Joy on Cooperation in Social Dilemmas.

Anna Dorfman, Yoella Bereby-Meyer, & Tal Eyal, Ben Gurion University of the Negev Israel

Our research explores how specific positive emotions of pride and joy influence behavior in social dilemmas. We suggest that emotions of the same valence (i.e. pride and joy) may differently influence people's choices in such conflicts. We base this proposition on the idea that social dilemmas resemble self control conflicts and on the notion that pride and joy differently affect self control. Recent research has shown that in a self control conflict, pride is related to the attainment of long-term goals whereas joy is related to the attainment of short-term goals (i.e. temptations). Additionally, the consideration of a future experience of pride enhances self control compared to the consideration of a future experience of joy, presumably because pride primes long-term goals whereas joy primes short term desires. We therefore predict that in social dilemmas, the consideration of pride would lead to behaviors that serve long-term collective interests, compared to the consideration of joy.

We conducted two studies to test this hypothesis. In both studies, participants first considered a future event that will elicit pride or joy. Then, they completed an unrelated dyadic task in which they could make pro social or self interested decisions. Our results show that in different social dilemmas participants who consider future pride behave more pro-socially compared to participants who consider future joy. In Study 1, considering future pride (vs. joy) promoted cooperation in a resource dilemma. In Study 2, in seventeen one-shot trust games, responders who considered future pride exhibited more positive reciprocity, than responders who considered future joy. Our results demonstrate that in social dilemmas people who consider pride cooperate more than people who consider joy.

Financial JDM (I) Q-401

Chair: Enrico Rubaltelli

1. Investing Morally: Psychological Determinants and Implications.

Enrico Rubaltelli, University of Padova, Italy

Lorella Lotto, University of Padova, Italy

Ilana Ritov, Hebrew University of Jerusalem, Israel

Rino Rumiati, University of Padova, Italy

Recent work in the field of behavioral finance showed that investments are instrumental to achieve different goals over and beyond the basic objective of gaining money (e.g., express one's values or status; Statman, 2004). Further, work on moral behavior showed that people consider the moral implications of their actions only when they are aware of the moral value of their actions (Tenbrunsel & Smith-Crowe, 2008). Across three experiments we tested empirically whether investors are exclusively motivated by financial goals or not. In particular, in Experiment 1, we found that people investing in moral assets were less disappointed than people investing in immoral assets when a stock performance was unsatisfactory ($t(120) = 3.33$; $p < .01$), although this difference was influenced by past investment decisions (e.g., whether the investor was already investing in a moral stock or not). In Experiment 2, participants who were investing in moral assets were also less interested in maximizing gains and more interested in being true to their values than participants investing in an immoral asset ($\chi^2(3, 379) = 61.10$; $p < .01$). Finally, Experiment 3 found that the motivation driving investment behavior mediates the effect of portfolio choice (moral versus immoral) on disappointment. Results support the hypothesis that investors try to achieve goals that are different from the simple objective of increasing their wealth; in addition, their reactions to the performance of a stock are influenced by the goals motivating their investment decisions.

2. Personal borrowing and repayment decisions: Mental accounting and the role of cost and loan duration information.

Rob Ranyard, University of Bolton

Centre for Decision Research, University of Leeds

Taking a bounded rationality approach, we assume that people simplify their personal financial world in terms of mental accounts within which future expenditure is not temporally discounted. A dual mental account model predicts that certain cost measures have an important role in borrowing and repayment decisions: monthly repayment amounts and total interest charges rather than compound annual percentage rates of charge (APR). The findings from an earlier process-tracing study and several recent questionnaire-based experiments are summarized and reviewed. These show that future-oriented borrowers are motivated to repay monthly as much as current assets and disposable income allow, in order to reduce total credit charges and loan duration. The latter is minimised in order to free up future resources for further spending and investment. Conflicting with this, we also find that borrowers anticipate future repayment problems by choosing somewhat lower monthly repayments. Finally, in addition to the above major drivers of credit decision making, our recent findings confirm that repayment decisions can be influenced by peripheral information presented on credit card statements, leading to anchoring effects; decisions to make higher or lower repayments than would have been made in the absence of such information. Several steps to support good decision making are proposed, including: (1) advice and education to facilitate understanding of APR; (2) clear presentation on credit card statements of the total cost and loan duration for a range repayment levels.

3. Early life investment experience and portfolio choice during booms.

Dimitra Papadovasilaki, University of Nevada, Reno

Standard economic models and finance theory have neglected the influence of early life experiences on economic and financial decisions, for the most part, although exceptions of course exist. However, in recent times there has been an interest in researching the importance of early life experiences on portfolio decisions (Buccioli and Miniaci, 2011; Buccioli and Zarri, 2013, for instance). Our research continues these recent contributions by testing the influence of early life experience on portfolio decisions in the laboratory. Our main finding is that subjects

that start their investment life with a sharp down market tend to behave more prudently during booms, a hypothesis that lends some support to Minsky's hypothesis of endogenous financial cycles.

4. An Empirical Test of Competing Hypotheses for the Annuity Puzzle.

Michael Goedde-Menke, Moritz Lehmsiek-Starke, & Sven Nolte, University of Muenster

This paper is the first empirical test of the explanatory power of different rational and behavioral hypotheses for the low demand for annuities observed in private markets. For this purpose, we specifically designed a questionnaire that allows us to investigate a broad range of different motives for or against annuities. To control for investor sophistication in our analyses, we construct a novel measure of "annuity literacy" consisting of a basic and an advanced score. The results from a representative survey among 1,500 German investors indicate that low demand for annuities is driven by individuals' desire to leave a bequest, their perception of annuities as investment rather than insurance products, and their distrust towards banks and insurers. Moreover, we find rather low levels of annuity literacy, with most respondents lacking knowledge of an annuity's core mechanics. In part, these low literacy levels can be attributed to questionable information policies applied by annuity suppliers.

5. Income Tax Reduces Productivity, Unless People are Both Egalitarian and Communitarian.

Scott Rick, Ross School of Business, University of Michigan

Gabriele Paolacci, Rotterdam School of Management, Erasmus University

Katherine Burson, Ross School of Business, University of Michigan

How do income taxes affect motivation to work? We propose that taxes may impose psychological costs that influence labor force participation and productivity, and that this effect might depend on individuals' "cultural philosophies." In particular, we hypothesized that income taxes may be aversive to the point of reducing people's motivation work, unless they strongly dislike inequality ("egalitarianism") and endorse government intervention ("communitarianism"). To obtain preliminary support of these insights, we complemented a secondary data analysis of the 2010-2012 ANES Evaluations of Government and Society Study (EGSS; a representative survey of the US population) with data on state income taxes. We found that state income taxes

were highest in states whose EGSS respondents were highest in both egalitarianism and communitarianism, and clearly lower elsewhere.

We investigated the effect of taxes on productivity by conducting an incentive-compatible labor experiment. Our participants were compensated for providing accurate counts of the number of zeros in matrixes made of zeros and ones, and could perform as many rounds of counting as they wished. Importantly, we manipulated whether earnings were taxed or not while controlling for net wages. Contrary to normative predictions, the mere presence of taxes decreases persistence and accuracy. However, people who favor both redistribution and government intervention were actually motivated by the presence of a tax, resulting in increased productivity and earnings.

Our results suggest that income taxes have effects on workers' motivation that go beyond their mere economic consequences. Depending on individuals' tolerance of inequality and endorsement of government intervention, taxes can boost or harm workers' productivity.

6. Examining the bright side of high confidence in tight financial situations.

Kathrin Johansen, University of Rostock

Cäzilia Loib, The Ohio State University

While a large literature in financial decision-making describes the detrimental effects of high confidence for investment decisions, less effort has been dedicated to understanding the role of confidence in everyday financial decision-making. We are using the German SAVE survey, a panel dataset which covers the years of the past recession to examine high confidence in tight financial situations where consumers face limited access to credit. We posit that audacity in hardship situations may actually benefit financial survival and provide a sense of life satisfaction.

Drawing from insights of both economic and consumer behavior literatures, the present study (1) portrays consumers exhibiting high (low) confidence in tight financial situations, (2) examines its effects on financial welfare, and (3) on health and social engagement. Preliminary analysis appears to support the hypothesis showing that highly confident consumers experience higher financial stability, greater satisfaction with health, work, income, and standard of living. We also find longer life expectancy, higher satisfaction with health, and a lower willingness to take health related risks.

The present research identifies a phenomenon that seeds a number of directions for future

enquiry. Our research shows, contrary to the long-established notion, that a sense of confidence in tight financial situations can have important consequences for overall financial wellbeing, life satisfaction, health of both the consumer and his/her partner. We plan to next connect the SAVE data with the identically-worded questions in the U.S. Survey of Consumer Finances to explore this intriguing area further.

Other Topcis (I) Q-402

Chair: W. Gaissmaier

1. 9/11, Act II: A Fine-grained Analysis of Regional Variations in Traffic Fatalities in the Aftermath of the Terrorist Attacks.

Wolfgang Gaissmaier & Gerd Gigerenzer, Max Planck Institute for Human Development

Subsequent to the 9/11 terrorist attacks, US traffic fatalities increased substantially, presumably because fear of dread risks induced a substitution of driving for flying (Author, 2004). However, increases in traffic fatalities were not at all uniformly distributed across the country, but there existed large regional variations, which we aimed to explain.

Method

Based on data from the 50 U.S. states we conducted a combined analysis of psychological reactions to terrorism and the structure of the environment. The important psychological reaction is fear induced by terrorist attacks, which we operationalized as proximity to NYC where post 9/11 stress reactions were greatest. The important aspect of the environment that allows fear to manifest in dangerous behavior such as driving instead of flying is driving opportunity, which we operationalized both as highway miles and car registrations per inhabitant.

Results

Both miles driven and traffic fatalities increased substantially in the aftermath of 9/11 compared to in the five previous years, and did so in many more states than expected by chance. Increased driving was the best predictor of increased fatalities and where they occurred. Regional variations in increased driving, in turn, could best be explained by fear and – to a greater extent – driving opportunity.

Conclusions

It is important not only to focus on the physical impact of terrorism, but also to fight the effects of terrorism in people's minds. Fear caused by terrorism can initiate potentially dangerous behaviors, such as driving instead of flying. But understanding fear is not enough. One also needs to consider whether and where the environment is conducive to generating increased driving to foresee where secondary effects of terrorism will strike fatally.

2. A Signal Detection Theory Analysis of Decision Making in the Referral and Substantiation Processes of the U.S. Child Welfare Services System.

Jeryl L. Mumpower, Texas A&M University, College Station, TX USA

Gary H. McClelland, University of Colorado, Boulder CO USA

Signal detection theory (SDT) was developed to analyze the behavior of a single judge, but can be adapted to analyze organizational and system decision making. SDT quantifies the ability to distinguish between signal and noise by separating the accuracy of the detection system from its response bias—the propensity to over-warn (too many false positives) or under-warn (too many misses). We use SDT to analyze the ability of the U.S. child welfare services system to detect child maltreatment. Data come from the Fourth National Incidence Study of Child Abuse and Neglect, National Child Abuse and Neglect Data System, and State of California Child Welfare Services Reports System. SDT analyses show that Blacks have higher rates of referral and that the system is less accurate for them than for Whites or Hispanics. There is a higher incidence of false positives – referrals leading to unsubstantiated findings – for Blacks than for other groups. There is also a higher incidence of false negatives – children for whom no referral was made but who are in fact neglected or abused. The rate of true positives—children for whom a referral was made and for whom that allegation was substantiated—is higher for Blacks. The values of d' (signal strength) are roughly the same for Whites, Blacks, and Hispanics but there are pronounced differences in C (a measure of the location of the decision threshold) across groups. Differences in C help to explain higher rates of referral, true positives, and false positives for Blacks. The analyses show that Blacks are treated differently from Hispanics and Whites in the child welfare services system. This research illustrates the potential of applying JDM techniques to organizational decision making problems with significant policy implications.

3. Effect of Induced Entrepreneurial Mindset on Venture-Decision Confidence.

Peter J. Boyle, Central Washington University, Seattle, U.S.A

Juyoung Kim, Sogang University, Seoul, Korea

An enduring question is why entrepreneurs are the way they are. Specifically, they are typically regarded as risk-seeking and overconfident. One explanation for the apparent overconfidence of entrepreneurs lies in the biased evaluation of information about prospective ventures. The bias, information distortion (ID), is the tendency to judge new information as more supportive of a leading option than is warranted by the information itself. One undesirable outcome of ID is unwarranted decision confidence. All entrepreneurs are faced with evidence supporting the undertaking of a new venture as well as not supporting it. When entrepreneurs are able to incorporate both kinds of information into a coherent story about their decision, confidence grows along with ID. Might the reason that some individuals evaluating business ventures decide to undertake those ventures (while others do not) be attributable to a stronger "coherence" mindset? If so, would ordinary individuals thus act more like entrepreneurs if they were induced to adopt a high-coherence mindset when making an entrepreneurial decision? That is, would they exhibit greater ID, higher levels of confidence, and other signature characteristics observed in entrepreneurs? Individuals with no entrepreneurial experience were randomly assigned to receive positive or negative encouragement about their entrepreneurial aptitude, then presented with a judgment task involving a hypothetical business venture. Those receiving positive encouragement adopted a high coherence mindset. They were more likely to choose to undertake the venture, and their levels of ID and confidence exceeded those of the negative (low-coherence) group. The results inform the value of undertaking strategies to encourage prospective entrepreneurs.

4. International Alliance Partner Selection: Experimental Assessment of Decision Making Process.

Andriy Ivchenko & Antonio Ladrón, Universitat Pompeu Fabra

This paper evaluates existing theories of the process of international alliance partner selection process and experimentally confirms the importance of adding behavioral decision-making perspective to the existing research in the field both for theoretical and practical reasons. We conducted a set of behavioral experiments with experienced business managers exploring their decision-making strategies in selection of potential alliance partner using decision-process

tracing techniques. Our results suggest that 1) selection of potential alliance partners depends on the decision process and strategies that managers' use; 2) the choice of potential partners depends on the presentation format and 3) the managerial decisions may be moderated to improve the decision quality.

5. Group and individual adaptation to changing environments.

Tomás Lejarraga, Max Planck Institute for Human Development

José Lejarraga, IE University

Cleotilde Gonzalez, Carnegie Mellon University

Small groups tend to outperform the average individual across a wide set of domains: they are faster and better in solving complex problems, they learn better in simple tasks, and they are more rational in economic games. Although past research has made substantial progress, most of these studies have focused on behavior in static settings, thus neglecting a fundamental aspect of real-world decisions: that the structure of the environment often changes and that successful behavior must adapt to these changes. How do groups compare to individuals when adapting to changes in the decision environment? We study three-member group and individual behavior in a repeated choice task with no stationary probabilities. Results suggest that groups performed better than individuals before a change in the decision environment, but individuals adapted better than groups after the change. Groups behaved more consistently than individuals and groups with leaders more consistently than groups without leaders.

6. Overconfidence or noisy beliefs? An experimental study of excess entry.

Sabrina Artinger, University of Oxford

Thomas C. Powell, University of Oxford

Excess market entry has achieved the status of real-world and experimental fact. The grim statistics of production overcapacity and business failure tell a story of entrepreneurial judgments gone wrong, and suggest the possibility of improving the theory and practice of market entry. But why is excess entry so pervasive? The current debate offers two kinds of explanations: psychological and statistical. Psychological explanations focus on cognitive biases like overconfidence (Camerer and Lovo, 1999) and egocentric bias (Moore et al. 2007),

whereas statistical explanations focus on noise in entrepreneurs' assessments of market capacity (Hogarth and Karelaia, 2012).

Our paper combines psychological and statistical explanations in one experimental test. Our starting point is Hogarth and Karelaia's formal model and simulation, which showed that noisiness in entrepreneurial beliefs is a sufficient condition for excess entry, irrespective of psychology. We designed skill-based experiments in which subjects chose whether to enter markets of varying sizes, under conditions of certain and uncertain demand. As a test of the psychological theory, we hypothesized that skill-based confidence would increase the degree of excess market entry in all conditions. As a test of the statistical theory, we hypothesized that excess entry would occur in small uncertain markets (where subjects' noisy beliefs are truncated at zero), whereas deficient entry would occur in large uncertain markets (where beliefs are not truncated in the lower tail).

The experimental results supported all hypotheses. Skill-based confidence induced entry in all market conditions, but variations in entry behavior across market conditions were driven by noisy beliefs. In particular, market volatility induced excess entry in small markets and deficient entry in large markets. We conclude that psychological explanations account for a base-rate of market entry in all conditions. However, noisy beliefs suppress entry in large, volatile markets while severely exacerbating excess entry in small, volatile markets – precisely the markets of greatest interest to entrepreneurs.

1.30pm– 3.30pm

Uncertainty and Probability (II) Q-101

Chair: Marus Lindskog

1. Bayesian Probabilistic Reasoning in a Category Learning Task.

Marus Lindskog, Anders Winman, & Peter Juslin, Uppsala University Sweden

Research on human probabilistic reasoning has mainly been concerned with the evaluation of subjective estimates against normative rules. It has moreover been dominated by the general conclusion that people are poor at probabilistic reasoning because they substitute facts about probabilities with subjective variables that are conveniently available. Three features of the typical probabilistic reasoning task, however, make strong conclusions difficult. First, base rates,

likelihoods, etc. are most often explicitly stated. Second, the tasks are commonly set up to give a posterior probability that is low, often .40 or smaller. Finally, the variable for which the posterior probability is estimated is often binary (blue or green cab, disease or no disease, engineer or lawyer, etc.). To address these issues we used a category-learning task where participants first learn probabilities for base rates and likelihoods from experience. Both base rates and the distance between categories (i.e., the likelihood ratio) were manipulated. Later, we elicited posterior probabilities on the entire 0 to 1 range for a continuous variable. These results show that our participants quickly learned to categorize the stimuli correctly regardless of base rates and likelihood ratio. Further, participants' subjective estimates of Bayesian posterior probabilities were well calibrated and informed by the base rates from the categorization task. Taken together, the results suggest that when people are allowed to learn base rates and likelihoods in a category-learning task they are able to produce subjective probability estimates that are well calibrated and sensitive to base rates. This, in turn, indicates that under some circumstances people might be quite apt at probabilistic reasoning.

2. Better the devil you don't know: preference for predictable or uncertain probabilities and the risk of failure.

Peter Ayton, Eugenio Alberdi, Lorenzo Strigini, & David Wright, City University London

Imagine being obliged to play Russian roulette – twice (assuming you survive the first game). Each time you must spin the chambers of a six-chambered revolver before pulling the trigger. However you do have a choice between two options. You can choose to either (a) use a revolver which contains only 2 bullets or (b) blindly pick one of two other revolvers: one contains only 3 bullets; the other just 1 bullet. Whichever particular gun you pick you must use each time (assuming you survive). Surprisingly option (b) offers a better chance of survival. We discuss a general theorem implying, with some specified caveats, that a system's probability of failure over repeated 'demands' depends on uncertainty concerning its probability of failure per demand. Nonetheless our experiments confirm the counterintuitive nature of the Russian roulette and other kindred problems: most subjects prefer option (a). We discuss how uncertain probabilities reduce risks for repeated exposure, why people intuitively eschew them and some policy implications for safety regulation.

3. Causal structure as an intervention to overcome base rate neglect: same old problems?

Presenting author: Simon McNair, PhD. Centre for Decision Research, Leeds University Business School.

Co-author: Aidan Feeney, PhD. School of Psychology, Queen's University, Belfast.

Aim: The research investigated whether, as has been suggested by Krynski & Tenenbaum (2007,) Bayesian inference can be improved by facilitating reasoners to consider the causal relations between different pieces of uncertain evidence, and whether combining this intervention with others (Euler diagrams, frequency formats) produced any further improvements.

Method: Three experiments are presented. Each involved paper-based statistical problems modelled on the mammography problem (Eddy, 1982.) All experiments employed between-subjects designs, with Problem Type (Causal vs. Standard) manipulated in each experiment. Other independent variables included Statistical Format (Frequency vs. Percentage, Experiment 1); Euler Diagram (Given vs. Not Given); and Numeracy (Higher vs. Lower.)

Results: Causal facilitation effects were demonstrated in each experiment, however, the rate of correct responding was consistently lower than that reported by Krynski and Tenenbaum, except when a population of highly numerate reasoners was tested. Experiments failed to find any benefit of providing data as frequencies, or in providing Euler diagrams.

Conclusions: Clarifying the causal relations between the evidence may improve reasoning by helping people to recognise how data should be integrated in Bayesian terms. However, for the majority such a manipulation does not lead to substantial improvements in judgement accuracy. Results suggest that in these cases people lack a basic numerical understanding of how to approach these types of probabilistic judgements. Reasoners that do have such knowledge are facilitated to appropriately apply this knowledge when the evidence can be easily thought of in terms of a causal model representation. The relatively low rates of correct responding observed, and our failure to find effects of other interventions, suggest that existing research has failed to adequately consider the overall ability of the populations tested.

4. Certain, possible, and improbable outcomes: A new approach to verbal probabilities.

Karl Halvor Teigen, University of Oslo, Norway

Marie Juanchich, Kingston University London, UK

Previous studies of verbal probabilities have tried to place expressions like a chance, possible, certain, and unlikely on 0-1 numerical probability scales. These "translation" studies conclude, despite considerable vagueness, that certain indicates a probability close to 100%, possible suggests probabilities around 50%, whereas low-probability negative phrases, such as improbable and unlikely, are typically assigned probabilities between 10% and 30%.

In the present studies we ask instead which outcomes are typically described by these expressions. In the first set of studies, we present participants with bar charts or tables describing complete distributions of outcomes, including range and frequency information. When, for instance, a sample of laptop batteries lasts from 1.5 to 3.5 hours, what is a certain and what is a possible duration?

The results of a first set of experiments show that speakers associate certain with low values and possible with high or maximal values, despite the fact that both extremes occur infrequently (in 5-10% of the cases).

In a second set of experiments, we focus on the pragmatic usages of unlikely and improbable. In contrast to previous "translation" studies, we find that they are most often associated with extraordinary outcomes that have a 0% frequency of occurrence. For quantitative outcomes ordered on a unipolar dimension, an improbable outcome is typically perceived as having a higher outcome value than those observed. These results are compatible with a causal (propensity) interpretation rather than a statistical (frequency) interpretation of probabilities.

5. Ecologically Rational Choice and the Structure of the Environment.

Timothy J. Pleskac, Michigan State University, East Lansing, United States

Ralph Hertwig, Max Planck Institute for Human Development, Berlin, Germany

In life risk is reward. This maxim largely reflects the economic constraints of our world. Yet, economic and psychological theories of risky choice have largely ignored this relationship. In fact, a basic tenet of many of these theories is that probabilities and payoffs are independent factors that determine the value of an alternative. An ecological analysis of life's gambles—

ranging from gambles in roulette to bargaining to artificial insemination of cows – show that payoffs and probabilities are often intimately tied. In some cases, the constraints of the market result in these two core ingredients of choice being related via a power function. Decision makers are keenly aware of this relationship and exploit it in the form of a heuristic—the risk-is-reward heuristic—to infer the probability of a payoff during decisions under uncertainty. We demonstrate how this inferential process can help explain observed ambiguity aversion. This ecological relationship between payoffs and probabilities can also help explain the shape of the psycho-economic scales of the utility and probability weighting functions. These findings indicate that theories of risky decision making need to model not only the decision process, but also the environment to which the process is adapting.

Choice (I) Q-102

Chair: Melike Erdogan

1. Fuzzy Multi Criteria Decision Making Methods in Energy Management: A Literature Review.

Melike Erdogan, Yildiz Technical University

İhsan Kaya, Yildiz Technical University

Multi-criteria decision-making (MCDM) is one of the techniques of operational research that have increasing usage and popularity especially in recent years. Multi-criteria decision making methods provide ranking or choosing among alternatives in the presence of conflicting criteria. These techniques can be applied to all areas of decision-making process is carried out. One of the areas of energy industry applied to the method of multi-criteria decision-making, such as ranking energy alternatives, selection of location for power plants or sorting energy projects. There are many MCDM methods that use in literature.

When these methods are integrated with the fuzzy set theory, practitioners provide more accurate and more sensitive results because of taking into account the uncertainty of the real-life. This expands to use of fuzzy MCDM methods.

Fuzzy decision-making is the collection of fuzzy membership functions and decision-making rules to provide the desired results from experts in the field (Dweiri and Kablan, 2006). In classical MCDM methods, degree of importance and weights for criteria are assumed that it is

known for certain. However, definitive data are inadequate for modeling problems encountered in reality. The fuzzy MCDM methods give effective results by quantifying data as well as providing the ability to use verbal uncertain variables when evaluating of alternatives and criteria (Karakaşoğlu, 2008).

2. Learning well but choosing poorly: Harsh choice environments that discourage good choices can still permit successful learning.

Tim Rakow, University of Essex, UK

Louise Wright, University of Essex, UK

When one option is objectively superior to the alternatives, suboptimal selections over repeated choices may reflect difficulties in identifying (learning) which option is best and/or inconsistency on the part of the decision maker. We explored these two potential drivers of sub-optimal performance in decisions from experience, where the probabilities of each outcome are not stated. In two studies, 151 participants made repeated feedback-based decisions for several two-option choice sets involving mixed (loss-gain) outcomes where one option was superior (i.e., stochastically dominated the other). For a given choice set, participants either received full feedback (for chosen and non-chosen options) or partial feedback (for the chosen option only). For the final 20 choices in each sequence, participants either continued with trial-by-trial choices or made a "policy" decision, selecting one option for all choices. Participants chose significantly less well in "harsh" choice sets where losses were more common than gains, particularly so when feedback was partial rather than full. However, participants were no worse at identifying the superior option in these harsh conditions, as evidenced by improved performance in policy decisions that varied little across choice sets. These findings point to paradoxical effects of feedback over repeated choices that interact with the choice environment; whereby, the amount of feedback is such that the decision maker can identify the better option, yet the nature of the feedback is such that they prefer not to choose this option consistently. An association between the tendency to endorse strategy diversification (questionnaire data) and suboptimal choices in the feedback-based decision task supports this interpretation.

3. Intuitive choices intensify emotional experiences: An overlooked reason for the “intuition bias”?

Geir Kirkebøen and Gro Hege Haraldsen Nordbye, University of Oslo, Norway

People have a tendency to overemphasize their intuitions, to prefer intuitively appealing rather than equally valid non-intuitive alternatives etc. We name this general tendency the intuition bias. The intuition bias is at the root of a variety of psychological phenomena and leads to several kinds of specific biases in judgments and decision making. There exist already many different kinds of plausible and well founded explanations for the intuition bias. We suggest still another, so far overlooked, reason for people's tendency to go with their gut, in particular with respect to decision making.

It is broadly accepted that behavior in general is shaped by consequences, and many studies indicate that characteristics of the decision process have a tendency to “leak” into the experience of the outcome (Keys & Schwartz, 2007; Kirkebøen et al., 2013). In line with this we assume that intuitive and non-intuitive choices influence the experience in the choice outcomes differently. Based on Chambon and Haggard's (2012) findings, we further assume that people experience a stronger sense of self agency after making an intuitive choice. Intuitive decision makers should therefore be more personally and emotionally involved. So, we hypothesized that people's tendency to go with their gut is reinforced by actual or anticipated emotional consequences of choosing the intuitive versus the non-intuitive alternative.

Data from two scenario studies and two retrospective (autobiographical) studies support this hypothesis and also the assumptions (mentioned above) it is based on.

4. Best-in-Hotspot: Choice Architecture to Attract Patients to High Quality Hospitals.

Barbara Fasolo, London School of Economics and Political Science

Elena Reutskaja, IESE Business School

Our Field Experiment, involving more than 500 UK residents, determines which of two Choice Architectures better allows patients to identify from an online comparison matrix the highest-quality hospital for their non-urgent surgery. We show that Best-First, architecture which places first the hospital with highest quality, helps patients choose it for their surgeries, yet more people can be attracted to the best quality hospitals by placing best hospital in the “hotspot”, or roughly in the middle of the scorecard. Scaling our results to the population of patients who

seek knee or hip replacement in the US each year, using architecture like Best-First means that 484,000 people would choose the highest-quality hospital. Placing best hospital in the hotspot rather than in first place could guide an additional 212,410 Americans towards the highest quality hospital- a substantial improvement for patients' and societal welfare. Our results fill a gap in the literature which had only gone as far as determining that both are "effective" ways to improve selection of best option from scorecards, and are a resource for policy makers who seek the ethical employment of Choice Architecture for improving Hospital Choice.

5. Partially Observable States and the Tendency to Rely on Small Samples.

Ori Plonsky & Ido Erev, Technion - Israel Institute of Technology

Three studies demonstrate that the tendency to rely on small samples is not always a result of cognitive limitations. It can be a byproduct of complex computations that were evolved to facilitate performance in dynamic settings. Study 1 is a computational analysis that demonstrates why the attempt to maximize performance in partially observable Markov decision processes (POMDP) can lead to reliance on small samples and to underweighting of rare events. Study 2 and Study 3 demonstrate that human behavior in POMDP is consistent with this hypothesis. Study 2 shows near perfect performance in a complex dynamic environment, and deviation from maximization in a simple static setting. Study 3 shows that people can adjust their strategies to the dynamic settings even when the adjustment requires good memory of long sequences of outcomes.

6. The Probability Paradox.

Eduard Brandstätter, Johannes Kepler University Linz

Research has shown that people are risk-seeking when the probability of winning is low but risk-averse when it is high. Within prospect theory this choice pattern is thought to be caused by over- and underweighting of probabilities. I challenge this widespread interpretation by theoretically showing that over- and underweighting ensues even when probabilities are neglected altogether. Two experiments further corroborate this paradox by showing that the choice pattern underlying probability weighting is more pronounced when probabilities are ignored and less pronounced when probabilities are considered. I conclude that (a) people might not over- and underweight probabilities, and (b) their choice process better conforms to simple

heuristics such as the priority heuristic than to prospect theory.

Social Aspects in JDM (II) Q-103

Chair: Yoella Bereby-Meyer

1. Honesty speaks a second language.

Yoella Bereby-Meyer, Ben-Gurion University, Israel.

Sayuri Hayakawa, University of Chicago, USA

Shaul Shalvi, Ben-Gurion University, Israel

Boaz Keysar, University of Chicago, USA

Recent research suggests that serving self-interest, even dishonestly, is an automatic tendency. But there is also evidence that people cheat more if they can justify doing so. To reconcile between these tendencies we suggest a dual processes model according to which people start by serving their self-interest (System 1), but attempt to refrain from cheating if they have enough time and no justification (System 2). Based on this deliberative correction process, we suggest that enhancing the involvement of that system will help override the impulse to cheat. One condition that may facilitate deliberation is the use of a foreign language. A foreign language is typically processed less automatically than a native tongue, which could lead to more deliberate processing. We conducted two experiments in which participants privately roll a die and report the outcome, which determines their pay. In Experiment 1, 60 participants performed the task in English (foreign) and 49 in Hebrew (native). The distribution of outcomes in English did not differ from a uniform distribution, consistent with honest behavior. In contrast, in the Hebrew condition the distribution was not uniform, and people reported a higher number on average in the Hebrew condition compared to the English condition. We replicated the results in Experiment 2 which was conducted on the internet. In it 206 participants performed the task in Korean (native) and 235 performed it in English (foreign). While both distributions were significantly different from a uniform distribution, participants cheated less in English. Thus, while cheating seems to be an automatic tendency, people cheat significantly less, or not at all, when using a foreign language.

2. How comparative feedback can "nudge" consumers to reduce energy consumption.

Michele Graffeo, University of Trento

Ilana Ritov, The Hebrew University of Jerusalem

Nicolao Bonini, University of Trento

The goal of the study is to investigate how comparative feedback affects the decision to save electric energy. We manipulated two characteristics of the referent used to create the comparative feedback: the level of identification of the comparative others (identified vs. unidentified), and the level of similarity with respect to group-belonging between the decision maker and the comparative others.

The participants answered a questionnaire that described how a relevant comparison group consumed 10% less electric energy than the participants' family did. Then the participants were asked if they were willing to modify their current energy consumption (consume more/less or the same amount of energy). In addition, we controlled the level of perceived similarity between the participant's family and the referent group and – as we expected – the participants perceived more similar the highly identified and in-group referent group.

However, the experimental condition that led more participants to state the intention to reduce their energy consumption is the "unidentified & in-group" condition, while the perceived similarity does not significantly affect this decision.

The participants are influenced by the degree of closeness between their group and the referent group, but not by the perceived similarity between the groups.

These experimental results could be used to create a communication strategy that could "gently push" the consumers to reduce their energy consumption, following the ideas presented by the "Nudge philosophy".

3. Misjudging the impact of advice: How advisors systematically misperceive their influence.

Christina A. Rader, Duke University

We study advisors' perceptions of their influence on an advisee. We find that advisors exhibit systematic, predictable biases. In certain contexts, advisors believe that they were highly influential when in fact they had no influence, and in other contexts they believe they had little influence when in fact they had appreciable impact. We propose that these biases occur because

advisors usually do not know what the advisee would have done absent the advice, and advisors' egocentric perspectives keep them from adjusting their assessments to account for the missing information. Therefore, advisees may appear to have taken advice, when in fact they were planning on taking that action in any case, leading advisors to overestimate their influence. Likewise, advisees can appear to have ignored the advice, when in fact, they shifted substantially from a position that was even further removed, resulting in advisors underestimating their influence. We discuss implications of these misjudgments for advisors' willingness to provide advice in the future and the resultant accuracy of the advisee's answers.

4. Kind, selfish, competing, or confused? Unraveling contribution decisions in public good games.

Jan K. Woike, Max Planck Institute for Human Development

Sebastian Hafenbrädl, HEC, University of Lausanne, Switzerland

We propose an experimental paradigm that allows to demonstrate and disentangle altruistic, selfish, spiteful and confused behavior in public good games (PGG). Participants in three studies (N=140) played two PGG implementing a variant of the voluntary contribution mechanism in groups of four. We manipulated two factors: 1) the return from investments into the group project was either low (creating a classic social dilemma) or high (making full contributions optimal) and 2) the feedback information given to participants was neutral, focused on group efficiency, or focused on relative results and rankings. In all conditions we added a dominated investment option to measure the prevalence of hedging behavior. We found clear evidence for (confused) hedging, yet the amount was small and does not provide a single explanation for observed spiteful and altruistic behavior in the two payoff conditions. The feedback manipulation showed a large effect with higher contributions in the efficiency condition and reduced contributions in the ranking condition.

5. Sharing Information is not enough: Repetition Biases in Hidden-Profile Situations.

Klaus Fiedler, Joscha Hofferbert & Franz Wöllert, University of Heidelberg

Research in the hidden-profile paradigm highlights the failure to exploit the wisdom of groups, which is crucial to all democratic decision making. Groups may not find out the best decision option if strong evidence for the best option's many advantages is unshared and distributed

across different group members, while the relatively weak evidence for few advantages of inferior options is shared by all members. As a consequence, individual group members favor the weaker option and fail to recognize the superiority of the best option. Previous research suggests that rendering the hidden profile transparent and revealing all unshared information is the key to solving the problem. In the present series of studies, we demonstrate that explicitly presenting all information in the hidden profile is no remedy. When all group members reported all their knowledge, but some items were selectively repeated, judgments were still biased toward the selectively repeated arguments. At the meta-cognitive level, judges were unable to correct for obvious repetition biases. Regardless of social validation (whether repetitions stemmed from same or different persons) and explicit instructions to ignore repetitions, redundant repetitions exerted a profound influence. Eliciting a cheater-detection motive (i.e., by pointing out that repetitions served vested interests) turned out to be an effective demand to correct the evaluative ratings of the decision options accordingly. However, the influence of repetition on recall and recognition persisted, suggesting that subsequent communications will maintain a repetition bias despite the local judgment correction. These findings highlight the importance of meta-cognitive and meta-communicative monitoring and control in rational decision making.

6. Social Preferences in the Lab and the Field.

Daniel Navarro-Martinez, Pompeu Fabra University

Paul Dolan, London School of Economics and Political Science

Matteo Galizzi, London School of Economics and Political Science

The study of social preferences (e.g., altruism, inequity aversion, reciprocity) has been one of the most active areas of research in the social and behavioural sciences in the last couple of decades. Much of that research has focused on the study of behaviour in economic games designed to tap into different aspects of social preferences. This line of research has been successful in uncovering a series of systematic behavioural principles that could explain behaviour in those games. However, at least two major issues remain to be resolved: (1) what is the relationship between social behaviours observed in economic games and pro-social inclinations measured by psychometric tools used in psychology? And (2) what is the relationship between social behaviours observed in economic games and social behaviours in the field? This paper takes a significant step in answering these two questions. We present an experiment in which participants play a number of the most prominent economic games used to

study social preferences, they respond to psychometric questionnaires used to elicit pro-social inclinations, and they face situations in the field in which they can behave pro-socially. This allows us to conduct a head-to-head comparison of economic and psychometric measures of social preferences, and also an analysis of how both measures relate to pro-social behaviours in the field. Our results provide important new insights into the relationship between different measures of social preferences and into their field validity.

Judgement and Intuition (II) Q-301

Chair: Nigel Harvey

1. Has something happened? Monitoring streams of data for signs of change.

Nigel Harvey, Matt Twyman, & Maarten Speekenbrink, University College London

People often need to monitor streams of data to decide whether there has been a change in the way they have been produced. Detecting such a regime change is often difficult because of random fluctuations and patterns in the data. However, this type of judgment is important in many situations. For example, doctors monitor diagnostic indicators for evidence treatment has been effective.

We simulated time series with various characteristics and presented them to people as graphs. On half the trials, the series contained a regime change: its mean level increased. On each trial, participants decided whether a change had occurred and expressed their confidence in their decision. The task was framed as one of monitoring water levels for increased risks of flooding.

A first experiment showed that higher levels of serial dependence (positive first-order autocorrelation) in the series increased false alarm rates and decreased confidence but had no effect on miss rates. This effect may occur because patterns in the series occasionally produced by the serial dependence are similar to the sort of pattern produced by a regime change. Gradual regime changes produced lower false alarm rates but higher miss rates than sudden ones. A second experiment generalised these effects to positive second order autocorrelation and a third one indicated that negative autocorrelation improved performance.

To investigate how people performed the task, we compared 1) a Bayesian model, 2) a model in which people compare the largest change in the series to the overall variability in the series, and 3) a model in which the largest absolute change in the series is compared with an internal

prototype representing effects of regime change. The second of these provided the best fit to the data.

2. Pitting Intuitive and Analytical Thinking Against Each Other: The Effect of Complexity Level and Presentation Format of Numerical Evaluation.

Zohar Rusou, The Open University, Israel.

Dan Zakay, Tel-Aviv University; Interdisciplinary Center (IDC) Herzliya

Marius Usher, Tel-Aviv University

The capability of the intuitive thinking mode to reach optimal decisions has been repeatedly demonstrated in the decision making. Yet, researchers widely agree that the explicit analytical deliberation is mandatory for symbolic numerical operations that require precision and the strict following of rules. The current paper addresses the question of whether this view is indeed warranted. In three studies, we pitted intuitive and analytical thinking modes against each other, on the same numerical evaluation tasks. The influence of two moderating factors was tested by varying: (1) the complexity level of the evaluation task, and (2) the format of information presentation (simultaneous vs. sequential). Analytical evaluations were found to be more accurate when the judgment task involved fewer numbers or a simultaneous presentation of the information. By contrast, intuitive evaluations were more accurate when the level of complexity increased and the numbers were presented sequentially. These results demonstrate the capability of intuition to apply mathematical rules and suggest that numerical evaluations are not always more accurate when arrived at by analytical deliberation. The complexity level and the information presentation format mediate the relative capability of the two thinking modes to produce optimal evaluations.

3. Process Evidence for a Causal Model Theory of Judgment.

Abigail B. Sussman, University of Chicago

Matthew LaMonaca, Princeton University

Presented by Daniel M. Oppenheimer, UCLA

Although linear and heuristic models have primarily defined the debate over how people combine information to form judgments, the Causal Model theory of judgment posits that an

approach based on causal reasoning may be able to subsume both models to explain judgments across environments in a single, unified framework. The Causal Model theory of judgment posits that people's cue weighting is a function of the causal relationships between various cues, suggesting that the presumed combination of heuristics and linear models is actually describing specific instantiations of reliance on causal models. Its predictions mimic the predictions of linear models for certain patterns of causal relationships, mimics heuristic models for others, and makes accurate novel predictions that neither linear models nor heuristics can easily explain.

Previous research on the Causal Model theory examined people's judgments, and used regressions to determine their cue weights. The results of these studies largely conformed to the outcomes predicted by Causal Model theory, but they did not provide substantial process evidence. Since the Causal Model theory does make predictions about information search and processing times, the present investigation used a process tracing paradigm to collect convergent evidence. We used Mouselab to observe which cues participants were considering as they were making their judgments. In addition to replicating earlier findings for cue weights, process data revealed that participants' search patterns were consistent with predictions of the Causal Model theory, providing additional evidence that participants are using knowledge of causal models when forming their judgments.

4. What are the chances of winning? Exploring the ecology and psychology of competitions.

Emre Soyer, Ozyegin University

Robin Hogarth, Universitat Pompeu Fabra

In competitions, n competitors are ranked on a criterion to determine k winners ($k < n$). We explore the ecology of competitions by modeling the probability of winning, taking account of numbers of winners, competitors, and relative skill level. We find that across different situations and skill profiles, probabilities cluster at the extremes (close to 0 and 1). Moreover, this holds when we vary n , introduce luck in outcomes, and individuals are overconfident. Using the multiple-cue probability learning paradigm to test whether people can learn to make appropriate judgments, we find that judgments reflect linear aggregation of informational cues but are biased: estimates do not cluster at 0 and 1; and there is little learning. Moreover, choices to enter competitions reflect this bias. Since the appropriate normative calculations are demanding, we investigate the use of heuristic rules and demonstrate their efficacy in improving judgments. Finally, we discuss variations of our model and suggest extensions of our paradigm.

5. Information Sampling and the Evaluative Advantage of Novel Alternatives.

Gael Le Mens, Universitat Pompeu Fabra

Yaakov Kareev, Hebrew University and Center for the Study of Rationality, Jerusalem.

Judith Avrahami, Hebrew University and Center for the Study of Rationality, Jerusalem.

What leads people to like new items, friends, practices and ideas? This has been attributed to imitation or to the superior quality of the new. But people also fall for the new in non-imitative contexts, or when the new is not systematically better than the old. This is surprising in light of the large amount of experimental evidence supporting the preference for the familiar, due to processes such as the mere exposure effect. Here, we propose a different, sampling-based, explanation for the evaluative advantage of the new. We build on prior work that has shown that when people learn about the qualities of uncertain alternatives from their own experiences and seek positive experiences, they will often undervalue uncertain alternatives. Noting that the amplitude of the underestimation increases over time, we demonstrate that novel alternatives have an evaluative advantage because people have not had time to learn to underestimate them. This is because the information samples people have for newer alternatives tend to be less biased than for alternatives that have been available for more time.

We first use some computer simulations to show that adaptive sampling implies that the new alternative will tend to be evaluated more positively than a similar alternative that has been available for more time. Then, we describe the results of an experimental test of our model. Participants behave according to the prediction of our model: they evaluate the newer alternative more positively than an older, similar, alternative. This can almost entirely be explained by the asymmetry in the information samples the participants collect in their sequential choice process. We conclude by discussing the sensitivity our result to our assumptions and by drawing distinct empirical implications.

6. Strategic Optimism: desired outcomes elicit wishful thinking, but only when they are self-relevant and highly likely.

Zafir Bloch-David, Tel Aviv University

Yoav Ganzach, Tel Aviv University

Orit Tykocinski, Interdisciplinary Center Herzliya

Yaniv Shani, Tel Aviv University

Does wishful thinking exist? Do people inflate their subjective probability estimates for those outcomes they desire? Past research suggests that they do. More recently, however, the robustness of this effect was questioned (Bar-Hillel & Budescu, 1995; Krizan & Windschitl, 2007, 2009; Vosgerau, 2010). In an attempt to reconcile this mixed evidence, we suggest that wishful thinking for desired outcomes is likely to be manifested only for events which are perceived as highly probable to begin with. This hypothesis was tested and supported in four scenario studies and two laboratory experiments. Based on our findings we delineate specific boundary conditions under which the desirability bias is likely to operate. We discuss our findings in terms of the desirability bias as a coping mechanism that is strategically used for self regulation.

Emotions (II) Q-302

Chair: Andrea Louise Taylor

1. Probability neglect in risky choice: the role of numeracy, cognitive reflection and happiness.

Andrea Louise Taylor, University of Leeds

Rob Ranyard, University of Bolton

Probability neglect refers to the process of making choices and judgements based on outcome information, while ignoring probabilities: a bias that can lead to suboptimal choices. We examined how probability neglect relates to numeracy, cognitive reflection, and intrinsic happiness. While the relationship between incidental positive affect and thought process has been widely researched, the influence of intrinsic happiness has received less attention. We thus sought to address this gap in the literature.

2. Regret and Disappointment in the Trust Game.

Luis F. Martinez, Instituto Universitário de Lisboa (ISCTE-IUL)

Marcel Zeelenberg, Tilburg University

The decision to trust someone or not and whether to reciprocate trust, can be emotionally

difficult and also result in intense emotions. We examined whether these decisions are influenced by exogenously induced emotional states. We chose to study regret and disappointment because of their relevance to decision making. We report two initial scenario studies (for both $N = 96$) and one study with real interaction and monetary payment ($N = 252$). Our research shows that regret decreased trust and trustworthiness, whereas disappointment increased them. Our research contributes to the understanding of how emotions affect decision-making in interdependent contexts. Specifically, disappointment appears to be particularly relevant as a motivator of trust and cooperation, whereas regret elicited opposite findings. Consequently, our research reinforces the fact that emotions play a key role in decision-making in social dilemmas, as the behavior of agents does not rely solely on their rationality.

3. Regret Aversion, Accountability and Decision Justification in the Decoy Effect.

Terry Connolly, University of Arizona (Presenting author)

Jochen Reb, Singapore Management University

Edgar Kausel, University of Chile

AIM: We test a model drawn from Decision Justification Theory (DJT) that both explains the decoy effect and provides a debiasing procedure.

METHOD: Experiment 1 ($N = 62$) tested regret priming as a debiasing procedure for the decoy effect in a personal preference task. Experiment 2 ($N = 242$) replicated this in a different preference task and in a second task involving prediction. It also tested the debiasing effectiveness of an external accountability procedure for the same two tasks.

RESULTS: Regret priming eliminated the decoy effect for both preference and prediction tasks. External accountability showed no debiasing effect in either task. Process measures suggested that accountability to others encouraged reliance on the plausible but spurious justification that the targeted (dominating) option gains value by being a "winner" (over the decoy). Regret priming, in contrast, makes justification to oneself more salient, which leads to critical examination, and ultimately to rejection, of the "winner" justification.

CONCLUSION: Both patterns of results are consistent with DJT in that they reflect participants' efforts to make justifiable choices. However, the results differ when the aim is justification to others (induced by demands for accountability) rather than justification to oneself (induced by making decision regret salient). Weak arguments favoring the dominating option are accepted in the accountability (external justification) condition, leaving the decoy effect intact. They are

rejected in the regret-primed (internal justification) condition, and the decoy effect disappears. This yields both a parsimonious account of the effect and a practical debiasing procedure for it.

4. The impact of affective and cognitive evaluations on pregnant women's decision about prenatal screening.

Danielle Timmermans, EMGO Institute for Health and Care Research, VU University Medical Center

Background: Affect influences decision making by affective evaluations during decision making (Slovic et al 2002) or anticipating emotional reactions to consequences of decisions (Mellers et al 1999), and may have a greater impact on risk-taking behavior than cognitive evaluations. The aim of the present study is to establish the effects of cognitive and affective evaluations as well as anticipated emotions on pregnant women's decisions about prenatal screening for Down syndrome, a complex and emotional decision.

Methods: 1650 women attending one of 44 midwifery and gynecology practices in the Netherlands were asked to fill out postal questionnaires before and after the prenatal screening offer. Measures included cognitive variables (perceived probability and perceived severity of getting a child with Down syndrome), affective variables (child-related anxiety, emotions related to decision making) and a measure of anticipating emotions ("I imagined how I would feel if I take / do not take the test").

5. Age-Differences in Affective and Deliberative Decision -Making.

Joshua A. Weller, Decision Research, Idaho State University*

Bernd Figner, Radboud University, Nijmegen*

Natalie Denburg, University of Iowa

*(*shared first authorship)*

Although understanding how individuals approach risky decisions is important throughout the lifespan, conceptualizing these processes in the elderly is especially vital given the increased number of medical and financial decisions that they must make. However, research has been mixed; some research suggests that older adults are prone to decision-making deficits, whereas other work demonstrates preservation in decision-making skills. We believe that these seemingly

contradictory findings may be reconciled by considering whether the decision more heavily recruits affective or deliberative processes. We predicted that for decisions in which emotional information can effectively guide decisions, older adults may not show impairment. In contrast, when emotional information cannot be utilized readily, the elderly may perform suboptimally compared to younger adults.

METHOD: Ninety-two adults (median age =65) completed two different versions of a dynamic computer card game (CCT, Columbia Card Task) that were used to assess risk-taking levels and information use strategies under hot and cold conditions (Figner et al., 2009).

6. Risk and Responsibility.

Darren Duxbury, University of Leeds

Barbara Summers, University of Leeds

A common perception, particularly in economics and finance, is that an individual's propensity to engage in risky behavior, such as investing in the stock market, is driven largely by their risk preference. Emotions, however, have been shown to role to play in such behavior. In the context of the disposition effect (selling winning shares, holding losing shares), Summers & Duxbury (2012) show that behavior thought to be explained by the S-shape value function in prospect theory is actually driven by emotional response. A determining element of an individual's emotional response is the degree of responsibility they have for the decision leading to the outcome they encounter (Zeelenberg et al., 1998). Responsibility has been seen to play a role in emotional response, which in turn has been shown to influence risky behavior. What role then does responsibility play in shaping risky behaviour? Is such behavior a manifestation of an individual's attitude to responsibility rather than their risk preference? We examine this issue via an investment experiment in which individuals engage in risky behaviour (holding shares) and report measures of risk preference and responsibility. We find that risk preference is a predictor of risky behavior, but this result is not robust to the inclusion of responsibility (controlling for gender and active/ passive choice). An individual's propensity to engage in risky behaviour is found to be driven more by their attitude to responsibility, with lower feelings of responsibility associated with increased risk taking behaviour, than their risk preference. Our findings have important implications for policy debate relating to default effects ('nudges' that may be seen as recommendations) in the context of pensions and saving for retirement.

Financial JDM (II) Q-401

Chair: Jon Michael Jachimowicz

1. Text messages reduce 'credit card effect'.

Jon Michael Jachimowicz, University of St Andrews (until 06/13) University of Cambridge (from 07/13)

Over the last two decades, personal consumer debt has risen alarmingly in developed countries; an issue partially caused by an increasing propensity of credit card usage rather than cash (McCall & Belmont, 1996). Contrary to assumptions of neoclassical economics, previous observational and experimental studies show that spending with credit cards is larger for similar purchasing situations in comparison to using cash. Feinberg (1986) terms this the "credit card effect". Pioneering work has indicated an expected increase of this effect with the development of new contactless payment methods, and so the present study aimed to design a cohesive model of social and cognitive factors involved in credit card expenditure and evaluated a potential behavioural intervention mechanism to reduce the credit card effect. Such an intervention may be beneficial for all market participants, as a lower default rate of credit card users will improve debt repayment rates, and ultimately increase credit card company's profit. A lab study was conducted that aimed to reflect realistic environmental cues, in which seventy-five participants were asked to make a number of purchasing decisions with either cash or student IDs, used as credit cards, with half receiving a text message after each purchase round displaying spending total. Not only was the credit card effect replicated, whereby participants in the credit card condition spent more than those in the cash condition ($F(2,72) = 16.84, p < .001, \eta^2 = .319$), but the behavioural intervention via text messaging proved significant in reducing total spend to cash levels ($p < .001$). Payment estimates taken across various categories after all purchases were completed point towards a stronger memory trace of purchases when followed up with a text message as the cause of this difference, affecting retrospective evaluation and aversive impact. Furthermore, participants with previous credit card ownership spent significantly more than those who did not ($t(23) = -2.292, p < .05$), indicating that social learning processes may contribute to the credit card effect. In order to investigate the psychological consequences of a cashless society for consumers, the advancement of contactless payment technology must be accompanied with an understanding of its complex interaction with spending behaviour. This enables the design of possible interventions to minimize foreseeable negative outcomes.

2. The Effects of Memory and Motivation on Reference Price Formation.

Jolie M. Martin University of Minnesota (United States),

Tomas Lejarraga, University of the Balearic Islands (Spain),

Cleotilde Gonzalez, Carnegie Mellon University (United States)

We explore how two contextual features of real-world marketplaces impact consumers' reference price formation: (1) the availability of information about past prices versus reliance on memory alone, and (2) the motivation to adopt high reference prices as sellers versus low reference prices as buyers. These factors may interact with information use in several ways. First, primacy and recency memory effects suggest that the first and last items of information will be recalled most readily when historical price information is unavailable to decision makers. Second, both emotional responses and deliberative reasoning about prices often reflect underlying motivations, suggesting that decision makers will focus on more favorable reference price candidates.

Our methodology was based on studies conducted by Baucells, Weber, and Welfens (2011). They showed participants the evolution of stock prices over time, and then elicited reference prices by asking participants the price at which they would feel neutral about selling the stock in the next time period. Each participant saw the same 60 price sequences, which were designed to differ on five informational variables: first price, last price, average intermediate price, high price, and low price. We extended this paradigm by testing interactions between these variables and the contextual factors of memory and motivation. Our 2x2 between-subjects design varied both the availability of past price information when participants reported their reference price, and the participant's role as buyer or seller.

Our results show that access to historical prices (rather than reliance on memory alone) and participant assignment to the role of seller (rather than buyer) both increase the weighting of early and high prices, but decrease the weighting of average and recent prices. This provides evidence for recency but not primacy memory effects, as well as motivated information processing depending on role. We conclude by discussing the role of memory and motivation in shaping reference prices across a range of consumer choices.

3. De-Biasing investors' volatility inadaptability.

Christine Kaufmann, University of Mannheim

Previous research suggests that investors face volatility inadaptability: their risk attitude predicts risk taking but they are unable to adapt to risky assets with different volatilities. This paper tests a potential explanation experimentally, namely that investors focus more on the absolute amount invested risky rather than the riskiness in terms of objective risk measures. We ask participants to select a return distribution for their portfolio. We use a between-subject design with two different risky assets and two different treatments. In the non-percentage group, we take away the possibility to identify the share of the portfolio invested risky to analyze whether investors now focus on the risk-return distribution compared to the control group where the percentages are shown. The two risky assets lie on one capital market line such that participants could end up with the same portfolio risk independent whether they were assigned to the riskier or the less risky asset. Results show that the selected portfolio risk for the group with the riskier asset compared to the group with the less risky asset is smaller if percentage rates are hidden. This means that investors adjust their absolute amount invested risky and hence come to similar objective portfolio risk if they are not able to focus on a simple heuristic – the absolute amount invested risky. These results are crucial for the new EU regulations, which require mutual funds to present the investment risk with the help of a simplified volatility risk indicator. Our findings show that investors seem to choose differently – they have a risky and a risk free mental account with fixed percentage allocation to each of the two accounts in mind and the overall portfolio volatility disregarded.

4. Do the Wise Get Richer? The Impact of Financial Wisdom on Financial Well-Being.

Hansjörg Neth & Mirta Galesic, Max Planck Institute for Human Development, Berlin (Germany)

Poverty and insufficient provisions for retirement are among the most prevalent risks to personal well-being today. Both research and public policy programs have focused on fostering numeracy (e.g. understanding basic probability concepts such as percentages and proportions) and financial literacy (e.g. calculating interest rates and knowing that bonds are typically safer than stocks) as key skills that contribute to improved financial well-being. We investigate whether, in addition to these skills, following simple rules for managing one's finances – such as "always keep something for a rainy day" and "don't put all your eggs in one basket" – can contribute to one's financial well-being. We developed an instrument for measuring this

concept of financial wisdom and compared its predictive validity with that of numeracy and financial literacy. In a study of 100 US participants, we measured their numeracy, financial literacy, financial wisdom, and indicators of subjective and objective well-being. Financial wisdom was correlated with the indicators of financial well-being and explained additional variance after controlling for the effects of numeracy, financial literacy, and income. Our results suggest that interventions to improve financial literacy should include simple financial heuristics and convey aspects of financial wisdom that help people to make wiser financial decisions.

5. Experts' perspective on consumers' perception and decision making in retail finance.

Inga Jonaityte, Ca' Foscari University of Venice

This paper explores how variation in presentation of financial information affects the likelihood of suboptimal financial decision-making by a little understood expert sample – financial advisers.

Focusing on the behavioral differences between expert and naïve subjects this study addresses the following targets: (i) Do financial experts perceive their customers as different from themselves? (ii) Are professionals biased? To what degree are their choices influenced by behavioral biases? (iii) If they are, are they biased in the direction showed by naïve subjects? (iv) Is there a correlation between response time and the evaluations? If yes, can it be explained by the dual-system theory [2]?

An experiment involving 621 financial promoters and 573 non-expert subjects show that expertise alone is not enough to prevent biased behavior. The analysis of nearly 1200 responses suggest that that experts (when compared to themselves) believe their customers to have significantly (i) higher willingness to invest in the product or the fund, (ii) higher propensity to recommend the product or the fund to others, (iii) higher willingness to invest in the risky option over the safe one, (iv) higher trustworthiness rating of the adviser promoting such investment options. Experts show superior ability to estimate the actual preference ratings reported by the naïve subjects. The issue of perceived trust-in-honesty and trust-in-competence to advice is significantly correlated with an individual's willingness to invest in a fund or an asset suggesting that selective use of interpersonal-cues may induce trust-related biases and shift experts' judgment.

This research provides valuable insights for future in depth research on the role of expert advice in context of financial choice.

6. A reminder of an organizations pro-social activities increases financial risk-taking of organization members.

Maria Blekher, Ben-Gurion University of the Negev (Israel)

Shai Danziger, Tel-Aviv University

Amir Grinstein, University of the Negev, Beer Sheva

Prior research demonstrate that decision makers take more financial risks after being reminded of a pro-social action they performed, or after choosing to engage in a pro-social activity. Recent findings suggest that people not only infer their attributes by a behavior carried out by group members with whom they feel connected, but also adjust their behavior accordingly. Based on these findings, we examine whether individuals engage in riskier decision making when the pro-social activity is not their own, but rather that of an organization to which they belong. In two studies we demonstrate that a reminder of organizations pro-social activities increases financial risk-taking of organization members. In the first study we show that reminding students of their university's pro social activities increases their monetary risk taking. In the second study we demonstrate that reminding professional investment advisors of their banks pro-social activities leads them to recommend riskier portfolios for their clients.

Consumer JDM (I) Q-402

Chair: Christoph Ungemach

1. Attribute Translations as a Choice Architecture Tool.

Presenting Author:

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Choice options are usually described as sets of attributes. There are many decisions that can be made about how many and how fine-grained descriptions to provide for a single attribute. Vehicle fuel economy, for example, can be expressed in terms of fuel consumption, fuel cost, or greenhouse gases emitted. These attribute descriptions are closely related, but focus attention on different aspects of fuel economy. In a series of experiments we examined how the presentation of different attribute translations can affect choice. We asked participants to chose between vehicles that differed in their tradeoff between price and fuel economy and manipulated the number and type of translated attributes expressing these two dimensions. It was predicted that the presentation of multiple translated attributes would increase influence of that dimension on choice based on two separate mechanisms: Evaluation of alternatives based on the number of favoring attributes and activation of different goals. We found that the presentation of translated, and to some extent redundant, attributes did affect preferences. Specifically, more fuel-efficient vehicles were selected when more translated fuel efficiency attributes were presented whereas cheaper vehicles were selected when more translated price attributes were presented. We also observed that translated attributes highlighting the environmental implications of fuel economy had a stronger effect on individuals with stronger pro-environmental attitudes. This interaction was driven primarily by the presence of an environmental metric and not simply by the number of translated attributes. The results highlight how translated attributes can be utilized as choice architecture to guide informed consumer choice.

2. Designing an Electricity Bill to Motivate Savings: The Effect of Format on Responses to Electricity Use Information.

Casey Inez Canfield, Carnegie Mellon University (United States),

Wändi Bruine de Bruin, Leeds University Business School and Carnegie Mellon University

Gabrielle Wong-Parodi Carnegie Mellon University (United States)

Electricity bills could be a low-cost strategy for improving feedback about consumers' home electricity use. Effective feedback would help households to save money on their electricity bills and reduce their environmental impacts. However, complex quantitative feedback may be difficult to understand, especially for consumers with low numeracy or low energy literacy. In a project funded by the US Department of Energy and a partnering electricity company, we built on the health communication literature, which has identified formats for communicating risks to low-numerate individuals.

3. Don't Tell Me What to Do! Consumer Reviews Are Valued Less for Experiential Purchases.

Hengchen Dai, Cindy Chan, & Cassie Mogilner

The Wharton School, University of Pennsylvania (United States)

Consumer reviews can be found for almost any purchase, but do shoppers consider these reviews useful for all types of purchases? This research explores how shoppers rely on consumer reviews when making experiential purchases (i.e., events that consumers live through) compared to when making material purchases (i.e., objects to be kept in consumers' possession). We show that when contemplating a future experiential (vs. material) purchase, shoppers discount the usefulness of consumer reviews and intend to spend less time reading them (Studies 1 and 2). However, shoppers of experiential and material purchases equally value information provided by companies (Study 2), suggesting that the patterns regarding consumer reviews cannot be extended to general information-seeking behaviors. Furthermore, when given a limited amount of time to make a purchase decision, shoppers of an experiential purchase tend to rely on consumer reviews less frequently than shoppers of a material purchase (Study 3). Finally, we show that the tendency to undervalue consumer reviews for experiential (vs. material) purchases is driven by the belief that other consumers' evaluations of experiential (vs. material) purchases are less representative of one's own evaluation (Studies 2 and 3). We also address alternative explanations for the underlying mechanisms.

4. How Awareness and Valuation of the Future Jointly Shape People's Financial Decisions.

Daniel M. Bartels & Oleg Urminsky, University of Chicago (United States);

Shane Frederick Yale University (United States)

We show that financial decision-making in the present is jointly affected by both the motivation to provide for one's future self and awareness of the long-term implications of one's choices. Feeling more connected to the future self—thinking that the important psychological properties that define your current self are preserved in the person you will be in the future—motivates people to make decisions that they recognize as more thrifty and prudent. We find that when opportunity costs are prompted: (i) connectedness and discount factors predict restraint in spending, (ii) both measured and manipulated connectedness relate to reduced purchasing, (iii) manipulated connectedness affects choices by changing the valuation of future outcomes (as measured by discount factors), and (iv) increasing connectedness increases price sensitivity. The

valuation of future outcomes only affects financial decisions when people are either explicitly reminded of or spontaneously consider tradeoffs between their short-run and long-run interests. Implications for the efficacy of information-based behavioral interventions and for prior research on intertemporal choice are discussed.

5. Suggest or Sway? Effects of Online Recommendations on Consumer Behavior.

Gediminas Adomavicius, University of Minnesota

Jesse Bockstedt, University of Arizona,

Shawn Curley, University of Minnesota,

Jingjing Zhang, Indiana University

Recommendation systems have become an integral part of the online retail sales environment. Research has focused on advancing technologies to improve the accuracy of predictions, while behavioral aspects are often overlooked. In five experiments, we explore how consumer preferences at the time of consumption are impacted by predictions generated by recommender systems. Studies 1–3 study the impact of recommendations on preference ratings. Using television programs and jokes as stimuli and using between and within-subjects designs, the studies investigate the anchoring effect immediately at the time of consumption. Doing so removes any memory influences that are often used as part of the explanation for anchoring effects. We also obtain evidence that the influence of recommendations is not due to attitude priming; but, the results are supportive of an explanation that the recommendation has informative content for the consumer. In Studies 4 and 5, we extend beyond ratings to study real economic behavior. Our manipulations used randomly assigned song recommendations, and actual system-generated recommendations that were intentionally perturbed (i.e., introducing error). We found strong evidence that participants' willingness to pay was significantly affected in each case. The results have significant theoretical interest by studying anchoring effects upon preferences, and at the time of consumption, each being more unusual for this area of research. The studies are also suggestive of the mechanisms by which recommendations operate as anchors. Finally, the results have significant implications for the use of recommender systems as well as for online retail practice, e.g., on recommender systems' performance metrics and design, potential strategic behavior, and trust.

4.00pm–6.00pm

Process Tracing Methods Q-101

Chair: Frank Renkewitz

1. An eye-tracking analysis of cognitive processes in memory-based quantitative judgment.

Frank Renkewitz & René Schlegelmilch.

University of Erfurt, Department of Psychology (Germany)

When remembering information that is no longer visible, people tend to look where the information was before. Recent evidence demonstrates that this looking-at-nothing phenomenon can be used to devise a process tracing method that allows inferring which information is recalled and used in memory-based decision making. However, there is no evidence pertaining to the question whether gaze behavior also reflects the weighting of attributes when a decision or judgment is formed from information stored in memory. The main goal of this study was to address this question. Participants learned attribute values of several hypothetical objects that were arranged within spatial frames. Later, they estimated the prices of these objects according to different weighting schemes. During this judgment phase, eye movements on empty spatial frames without attribute values were recorded. Predictions for gaze behavior were derived from evidence accumulation models. According to such models, attributes should be repeatedly sampled with a probability proportional to their relative importance. Our results corroborate this assumption: Gaze behavior indicated differential recall of attributes when only a limited number of attributes was relevant for the judgment task. More importantly, when all attributes had to be integrated the weighting of attributes was reflected in longer looking times to former locations of more important cues. These results also support the idea that eye tracking can be used as a source of process tracing data in memory-based quantitative judgments.

2. Better Than Expected But Surprisingly Unrelated: Short- and Long-Term Stability of Information Search and Choice.

Thomas Scherndl & Anton Kühberger, University of Salzburg, Austria

We investigate the stability of preferences and of information search patterns in consumer decision making. Previous research has shown limited stability of preferences, and there is little research on the stability of information search over time. We contribute to this research by investigating the short-term (30 minutes) and the long-term stability (one week) of choices and of the corresponding information search. Participants were presented with naturalistic consumer choice scenarios and their information acquisition was tracked using MouselabWeb. Scenarios were presented three times: at the beginning of the first session (T1), at the beginning of the second session one week later (T2), and at the end of the second session (T3). This enabled us to investigate short term stability (T2-T3), and long term stability (T1-T2).

We found that participants searched for less information and were faster in completing the task from T1 to T3. However, choices were largely stable for most participants. Similarly, process measures were highly correlated over time as were the weights of dimensions. Interestingly changes in process data were not related to corresponding changes in choices. Taken together, these findings suggest something like a 'trait' of information search behavior which is yet only moderately related to final choices. We argue that this may be because information acquisition data are noisy in the sense that they contain reading processes independent of actual preference formation. We propose cleaning of information search data from reading artifacts before deeper analysis and suggest some ways to do so.

3. Response dynamics in social dilemmas: Dissecting the influence of social norms, fear, and greed.

Pascal J. Kieslich; University of Mannheim, Germany;

Benjamin E. Hilbig; University of Mannheim, Germany;

*Felix Henninger; Max Planck Institute for Research on Collective Goods, Bonn, and
University of Mannheim, Germany;*

When investigating cooperation in social dilemmas, most studies have focused exclusively on analyzing the decisions made by participants. Thereby, cognitive processes that take place during the formation of these decisions have mostly been ignored. The current study attempts to fill this gap by taking a closer look at the decisional conflict experienced by an individual before actually deciding to cooperate or to defect in social dilemma games. Based on research on the influence of social norms, we hypothesized that individuals experience more conflict when defecting than when cooperating. In addition, it was examined whether greed or fear has a

stronger influence on cooperation. To do so, three types of games with different payoff structures (Stag Hunt, Chicken, and Prisoner's Dilemma Game) were employed, such that either fear, greed, or both would motivate defection. To assess decisional conflict, response latencies were measured. More importantly, building on recent methodological advances in analyzing response dynamics, the mouse movement trajectories of participants during the decision process were recorded. Longer reaction times and more curved trajectories were taken as indicators of higher decisional conflict. Results showed that participants generally took longer and responded in more curved trajectories when defecting than when cooperating. A comparison of the different games further revealed shortest response latencies when cooperating once only fear motivated defection. In sum, the results suggest a strong influence of social norms on the formation of decisions in social dilemmas. In addition, greed seems to be relatively more important than fear in terms of motivating defection.

4. Predicting your choice before you choose: Eye-tracking based analysis of temporal decision dynamics.

Vinod Venkatraman, Fox School of Business, Temple University

John W. Payne, Fuqua School of Business, Duke University

Eye tracking has been used as an effective tool to study decision making processes over the past few decades. One potential advantage of eye-tracking as a process tracing method is that the tremendous richness of temporal data obtained allows us to study the dynamics of information acquisition and processing within each decision problem as it is solved. Here, we present two sets of findings from eye tracking studies using a complex risky choice task. First, we characterize dynamic changes in information processing within a decision episode. Specifically, we show a diverging pattern in the degree of attention paid to the decision alternatives, such that the alternative corresponding to the eventual choice is processed increasingly more over time. Of particular interest, this divergence in attention occurs relatively early in the decision process. Next, we show that the temporal variability in the moment of divergence within a decision episode differs as a function of task variables and decision context. Specifically, in simple fixed display decision environments, the alternatives diverge significantly earlier in the decision process compared to more complex random display decision environments. Finally, we also demonstrate that the divergence could be associated with distinct differences in attention to specific attributes (gains, losses, probabilities) within the chosen alternative. We argue that the proposed methods and findings have tremendous implications, particularly for

understanding the effects of task environment and decision states on complex risky choice.

5. Psychological accuracy of risky choice models based on option- vs. dimension-wise evaluations.

Joanna Sokolowska, Warsaw School of Social Sciences and Humanities (Poland)

The four experiments presented here are aimed at determining psychological accuracy of compensatory models based on global evaluations (e.g. Cumulative Prospect Theory – CPT) and non-compensatory models based on dimension-wise comparisons (e.g. Priority Heuristic – PH, Minimax, Maximizing Cumulative Probability of Winning – MCPW). The focus is on the way of reasoning represented by certain classes of models rather than on distinguishing between specific models within the same class (e.g. PH vs. Minimax).

Non-compensatory models differ between themselves in emphasizing the significance of either the amount or the probability of loss. Since previous findings do not support either hierarchy, Experiments 1– 2 were designed to test relative importance of these dimensions. In these experiments subjects chose among two-outcome options in which payoffs and probabilities were in conflict.

In contrast to the majority of previous studies in which lotteries were either in the domain of gains or losses, choices in Experiments 3–4 were among non-trivial, multi-outcome lotteries with mixed payoffs. They were constructed such that each option was favored by a different model. Such lotteries provide richer material for process tracing analysis.

In all experiments choice fractions and process tracing characteristics were analyzed.

6. How we play games: Eye movements and decision making in prisoner's dilemma, stag hunt, and hawk-dove games.

Neil Stewart, University of Warwick

Simon Gächter, University of Nottingham

Takao Noguchi, University of Warwick

Eye movements were recorded while participants played 2x2 symmetric games including dominance-solvable games like prisoner's dilemma and asymmetric coordination games like stag

hunt and hawk-dove. The set of games was drawn from a parametric structure, allowing us to explore how eye movements vary as games are smoothly morphed from one type into another. Choices varied considerably across the different kinds of games, but the pattern of eye movements was only slightly different. There was no qualitative shift in the pattern of eye movements as the category of games changed (e.g., from prisoner's dilemma to hawk-dove). Eye movements were consistent with people choosing in the same way across the different games. But the small differences in eye movements did predict the large differences in responding. People have a small bias to look more at larger payoffs and ultimately develop a preference for the choice with higher payoffs. Key theoretical accounts from the literature are tested (level k—Costa-Gomes & Crawford, 2006; Nagel, 1995; Stahl & Wilson, 1995, and cognitive hierarchy—Camerer, Ho, & Chong, 2004) but eye movements are more compatible with a much simpler gaze-cascade model of choice (Shimojo, Simion, Shimojo, & Scheier, 2003).

Choice (II) Q-102

Chair: Manel Baucells

1. Testing a new odd theoretical prediction: Sunk-cost effects and the flat-rate bias are negatively correlated.

Manel Baucells & Giampaolo Viglia, University Pompeu Fabra (Spain)

The empirical literature has observed two robust and widely prevalent anomalies in economic behavior: resistance to dispose of obsolete goods (sunk-cost effect) and a preference for pre-payment over pay-per-use (flat-rate bias). One may predict that, at an individual level, these two are positively correlated (both are biases), or uncorrelated (each reflects a separate thinking processes). A recently propose theoretical model called MARA (Baucells and Hwang, 2013) explains both anomalies using a process of mental accounting and reference price adaptation (MARA). According to the MARA, these two anomalies are negatively correlated. The theory links both biases via a process of reference price comparison and responsiveness to new pieces of information.

We conduct a two-step experiment where firstly we elicit reference prices and afterwards we measure at individual level, the extent of the sunk-cost effects and the flat-rate bias. As predicted by MARA, we find that sunk-cost effects and flat-rate bias are negatively correlated. Moreover, as predicted by the theory, people who have a high speed of price responsiveness

(update fast their reference prices) have a tendency to prefer to pay everything in advance while people who are slow in price responsiveness (update slow their reference prices) have a tendency to show a higher presence of sunk-costs. This result is remarkable because these predictions are far from intuitive, and gives support to MARA, a general theory of reference price formation and comparison.

2. Approximating rationality under incomplete information: Adaptive inference mechanisms for missing cue values.

Marc Jekel, Andreas Glöckner, University of Göttingen (Germany),

Arndt Bröder, University of Mannheim (Germany)

Viktoriya Maydych MPI Collective Goods (Germany)

In a highly uncertain world, individuals often have to make decisions in situations with incomplete information. In three studies, we investigated how people treat missing cue information in complex probabilistic inference tasks with multiple probabilistic cues. Our results consistently show that people do not treat missing information always in the same way but adapt their interpretation of missing information to specific properties of the environment. In environments with cues that have a high base-rate of positive cue values (i.e., more positive than negative predictions of the cue), individuals fill in missing information of these cues using the base-rate information. In other environments, however, in which base-rates are less informative, individuals switch to using other properties of the cues, specifically its discrimination rate (i.e., how often the cue makes distinct predictions for the options). This pattern of adaptively interpreting missing information is found in environments in which participants are explicitly provided with information concerning base-rate and discrimination rate of cues (Exp. 1) as well as in environments in which they have to learn this information by experience (Exp. 2). The results also hold in environments with further increased complexity (Exp. 3). In all studies, the adaptive interpretation of missing information and its integration with the other available cue values enabled participants to make choices that approximate the rational solution for the problem. Overall, our studies demonstrate individuals' high capabilities for handling complex and incomplete information adaptively.

3. Intransitive cycles and rational choice.

Johannes Müller-Trede. Rady School of Management, University of California, San Diego (United States)

Shlomi Sher Department of Psychology, Pomona College (United States)

Craig R.M. McKenzie Department of Psychology and Rady School of Management, University of California, San Diego (United States)

Transitivity is a fundamental principle of most normative models of decision making. For preferences to be transitive, a decision-maker who prefers option a to a second option b, and this option b to a third option c, must also prefer a to c. Results from several previous experiments have led researchers to conclude that preferences are sometimes intransitive. Recently, however, it has been argued that there is a lack of evidence to warrant this conclusion, as advances in order-constrained statistical inference have made it possible to re-assess the data from these studies. We provide evidence for intransitive choice patterns in a novel experimental paradigm which holds up against the new standards derived from these mathematical advances. Many of our participants exhibit stable and statistically significant intransitive cycles when making pairwise choices from a set of three options. We do not, however, interpret these cycles as evidence for genuinely intransitive preference. Instead, we argue that the intransitive choice patterns arise from the inferences our participants make regarding the attributes of the options they are choosing from. Rather than constituting an "irrational" violation of the transitivity principle, under this interpretation an intransitive cycle can be the result of rational information processing, in which different choice sets lead to different inferences, and different inferences lead to different (transitive, or partial) preference orders. These findings suggest a modified view of the relations between rationality, transitivity, and choice behavior.

4. Do preference reversals only occur in the absence of preference?

George Farmer, University of Manchester

Additional authors:

Paul Warren, University of Manchester

Andrew Howes, University of Birmingham

Wael El-Deredy, University of Manchester

Shahd Majdub, University of Manchester

The attraction effect (Huber, Payne & Puto, 1982), suggests that a person's preference for option (B) over option (A) can be reversed by expanding the choice set to include a decoy option (D) that is similar but inferior to (A). In the many replications it is implicit that the effect depends on the target (option A) and competitor (option B) being equally preferred, or hard to choose between. Indeed a recent replication started by finding gambles that participants choose equally often, and then used these as stimuli to test for the effect (Soltani, De Martino & Camerer, 2012).

We tested whether indifference is necessary to induce the effect by increasing the difference in expected value between the target and competitor gambles. In other words, the more obvious we made it that one of the gambles was better, the fewer preference reversals we expected to obtain. Results showed a steady decline in preference reversal rate as the difference in expected value increased. We believe these results raise an important theoretical issue. The attraction effect is interesting because it suggests that people assess alternatives by comparing them. This rules out a class of rational decision models that rely on people assessing alternatives independently of one another. These rational models are simple, optimal and apply across many domains. We dispute that the attraction effect is problematic for such theories. As our data show, the effect peaks precisely when an independent assessment would make no difference because the expected values of the options are the same. As we increased the difference in expected value so people increasingly behaved in a manner consistent with an independent assessment of the alternatives.

5. Dynamic Consistency in Collective Decisions.

Laurent Denant-Boemont, University Rennes 1 - CREM, France.

Enrico Diecidue, INSEAD, Fontainebleau, France.

Olivier L'Haridon, University Rennes 1 - CREM and Greg-HEC, France.

Economic models usually assume that individuals or organizations are rational in choice over time. In this paper, we propose new evidence from the lab on the efficiency achieved by collective and individual decisions over time. We combine static and longitudinal methods to address the issue of stationarity and consistency of time preferences. The collective decision process was designed to favor coordination among voters thanks to initial communication over voting intentions. Following Halevy (2012), we test four conditions on individual and collective

time preferences: impatience, stationarity, age independence and dynamic consistency. Our main results are the following. In line with the existing literature, individuals were impatient and deviated from rational behavior. On the contrary, groups took patient and highly consistent decisions. Regarding the group decision process, we observed that our voting mechanism helped groups to converge to stable and dynamically consistent decisions.

6. Known Unknowns in Judgment and Choice.

Daniel J. Walters, Craig Fox, Anderson School of Management, UCLA

Philip M. Fernbach, Leeds School of Business

Steven A. Sloman, Brown University

Metacognitive knowledge—knowledge of what we know and don't know—is a critical ingredient for rational decision making. In five studies we explore the role of metacognitive knowledge in judgment and choice. We find that people primarily focus on known facts (known knowns), while underweighting facts they know are unknown (known unknowns), this tendency is related to Cognitive Reflection Test (CRT) scores, and it predicts biases such as the illusion of understanding, overconfidence and the comparative ignorance effect. More specifically, in Study 1 we find that the common illusion of understanding of how complex objects work (Rozenblit & Keil, 2002) only afflicts lower CRT scorers. In Study 2 we find that the tendency to place 90% confidence intervals too narrowly is more pronounced among lower CRT scorers. In Study 3 we find that comparative ignorance effects (Fox & Weber, 2002), (the enhanced reluctance to bet on uncertain events following the addition of relevant information that participants do not know how to use) are more pronounced among lower CRT scorers. In Studies 4 and 5 we find that we can significantly reduce overconfidence and comparative ignorance effects by first inducing participants to confront their illusion of understanding concerning unrelated topics (e.g. explain in detail how a toilet works), which we think prompts them to subsequently attend more to known unknowns. Collectively, these studies suggest that failure to consider known unknowns is indicated by lower CRT scores, underlies common judgment and decision biases, such as overconfidence and comparative ignorance effects, and can be ameliorated by shattering the illusion of understanding an unrelated mechanism or process.

Symposium I: A cross-national study of uncertainty and perceptions of Global Climate Change Q-103

Chair: David V. Budescu

Discussants: Thomas S. Wallsten & Wandu Bruine de Bruin

1. The 2012 cross-national study of uncertainty and perceptions of Global Climate Change.

D. V. Budescu, Han-Hui Por, M. Balassiano, I. Barbopoulos, S. Broomell, J. Fuller, C. Gonzalez Vallejo, L. Hadar, A. Hansla, E. Hoelzl, Z. Hichy, M. Juanchich, A. Maydeu-Olivares, K. Nakamura, D. Önköl, M. Sirota, M. Smithson, J. Sokolowska, G. Villejoubert, & C. Witteman

Presenting Authors: David V. Budescu and Han-Hui Por (Fordham University, USA)

Co-authors (listed alphabetically):

Winton Au (Chinese University of Hong Kong, PRC)

Moises Balassiano (FUCEPE Business School, Brazil)

Isak Barbopoulos (Göteborg University, Sweden)

Stephen Broomell (Carnegie Mellon University, USA)

Josh Fuller (Seoul National University, Korea)

Claudia Gonzalez Vallejo (Ohio University, USA)

Liat Hadar (Inter Disciplinary Center, Israel)

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Humanities, Poland)

Gaelle Villejoubert (Kingston University, UK)

Cillia Witteman (Radboud University, The Netherlands)

The IPCC reports uses a scale including seven verbal terms (e.g., very likely) to communicate uncertainty. Budescu, Por and Broomell (2012) have shown that the public misinterprets the probabilistic statements, and that there are large individual differences in the interpretation of these statements. These studies suggest that supplementing the probability words with numerical ranges would make communication of uncertainty more effective. The goal of the present study was to replicate these results across countries and languages and to document cross-national differences. We administered a survey in 27 samples and 18 languages and obtained a total of 10,792 valid responses (average sample size of 400). Participants were randomly assigned to one of two experimental groups: The only difference between them was the way the uncertainty was communicated. As predicted, the IPCC pronouncements are interpreted by the public in an extremely regressive fashion (closer to 0.5) than intended. The dual presentation format (Words and Numbers) is highly beneficial: (a)the level of correspondence between the public's interpretation of the terms and the IPCC guidelines increased significantly; (b)the terms are better differentiated by the readers; (c)the range of values associate with the various terms is reduced. These qualitative patterns are remarkably stable across all samples and languages, although the magnitude of the improvement induced by the new presentation method varies across samples. These results provide the strongest possible justification for changing the way the IPCC communicates uncertainty to the public all over the world.

2. Predicting mitigation action: A cross-national analysis.

Presenting Author: Stephen Broomell, Carnegie Mellon University.

Co-authors: David V. Budescu, Han-Hui Por, Fordham University.

Previous research has linked individuals' decisions to engage in mitigation actions with environmental beliefs, values, knowledge, and ideology. However, individuals' beliefs about climate change vary considerably across individuals, over time, and shift in response to local weather patterns that can only be weakly related to climate change. To date, much of the research on this topic has been performed in the United States and in the United Kingdom.

However, climate change is a problem that will impact all countries, and it is important to test the generalizability of these results on an international scale.

We test a prediction based on Construal Level Theory that the decision to endorse concretely construed mitigation actions will draw upon a concrete construal of global warming represented by perceptions of personal experience with climate change. We designed a survey to measure endorsement of general (abstractly construed) and specific (concretely construed) mitigation action along with most of the important predictors of action identified by previous research. Results indicate that considerations of specific actions tend to draw more on feelings of personal experience with global warming across 25 samples from 20 countries. These same samples also show that statements of general intentions to act draw more on feelings of self-efficacy. This result is concerning because personal experiences are driven by local weather patterns that can only be weakly related to climate change, and may cause the public to change its mind about actions as a function of changes in local conditions. Our research provides a theoretical framework for consideration of behavior and informs global communication practices with regard to mitigation action.

3. Mixed beta GLMs for analyzing laypersons' numerical translations of IPCC probability expressions.

Michael Smithson, Australian National University, Australia

Laypersons' numerical translations of IPCC probability expressions were collected under two conditions: Verbal-Numerical (VN) and Translation (T), in samples from 6 English-speaking countries (Australia, Canada, India, RSA, UK, and USA). The translations consisted of lower, best, and upper estimates of the probabilities respondents believed each IPCC expression was intended to convey.

Mixed GLMs for beta-distributed variables were used to model the responses. Beta GLMs are uniquely suited to modeling judged probabilities because probabilities are doubly-bounded and inherently heteroscedastic. Beta distributions have doubly bounded support and beta GLMs enable modeling dispersion as well as mean-response.

Four hypotheses were tested and supported by most of the results:

1. The lower, "best," and upper estimates all are more extreme (i.e., closer to 0 or 1) in the VN condition than in the T condition
2. The lower, "best," and upper estimates all are more consensual (i.e., less variability

between respondents) in the VN condition than in the T condition.

3. The lower, "best," and upper estimates all are more extreme for positively-worded probability expressions than for corresponding negative probability expressions (e.g., "very likely" vs "very unlikely" and "likely" vs "unlikely").

4. The lower, "best," and upper estimates all are more consensual for positively-worded probability expressions than for corresponding negative probability expressions.

4. How much will the sea level rise? It depends on the format of uncertainty communication.

Presenting Author: Miroslav Sirota, King's College London, UK

Co-author: Marie Juanchich, Kingston University, UK

Aim

Traditionally, verbal probabilities (there is a chance, it is certain) have been considered as vague probabilistic quantifiers and studied through their probabilistic translation (e.g., a chance can be "translated" into a 30-40% probability). In contrast, a recent trend of research has focused on how people form verbal probability predictions when they are given a frequency distribution of outcomes. In this research, participants select an outcome from a distribution of outcome values to complete a prediction (Juanchich, Teigen & Gourdon, 2013; Teigen & Filkuková, 2013; Teigen, Juanchich & Filkuková, 2013; Teigen, Juanchich & Riege, 2013). The main finding from outcome completion tasks is that when forming a prediction, participants do not select outcome magnitude based on the probabilistic meaning of probability terms but rather based on pragmatic or conversational rules. For example, possible, which is traditionally associated with a medium probability of around 50%, was often associated with the most extreme, the least likely and rare top outcome. The probabilistic translation and the outcome completion tasks show a probability-frequency gap. On one hand, the probabilistic translation approach showed that people associate unlikely with probabilities of around 20%, possible with around 50% and certain with around 90%. On the other hand, the outcome completion task showed that when forming predictions, people associate certain and possible with low frequency outcomes (5%-10%) and unlikely with even less frequent outcomes (0%).

The aim of the present paper is to find tools to encourage people to form better calibrated predictions (i.e., more consistent frequency-probability relationships). It was hypothesised that replacing (or associating) verbal probabilities with numerical probabilities would help people complete an uncertain sentence based on frequentistic rules rather than based on pragmatic

rules of conversation.

Method

In a between-subjects design, the probabilistic format was manipulated (i.e., verbal, numerical, and dual format; see Table 1). The same manipulation was used in three experiments featuring predictions conveying different probabilities (low, high and medium).

Symposium II: Multiple numeric competencies in judgment and decision processes Q-301

Chair: Ellen Peters

Discussants: Ellen Peters & Valerie Reyna

1. Numeracy and shared decision making between doctors and their patients.

Garcia-Retamero, Cokely, Wicki, & Hanson

In this talk, we review a collection of studies investigating the influence of numeracy on preferred and actual roles in decision making in doctors and their patients. Our research indicates that physicians with high numeracy often involve patients and promote shared decision making. In contrast, physicians with low numeracy tend to play a paternalistic role and involve patients less often. These results accord with previous research showing that numeracy also influences the degree to which patients want to be involved in decision making. On the whole, this research converges to suggest that physicians and patients with low numeracy tend to favor a paternalistic model of medical decision making, in which physicians are dominant and autonomous and make decisions on their patients' behalf. These findings might be troublesome given that the paternalistic model of medical decision making is increasingly being questioned. Importantly, the results of a large intervention study showed that using transparent visual aids—i.e., information formats that improve risk understanding but do not require high levels of numeracy—caused doctors and patients with low numeracy engage more in shared decision making. In conclusion, willingness to participate in medical decision making does not necessarily require a high level of numerical ability. Rather, shared decision making can be encouraged when transparent, easy to understand numerical information formats are provided.

2. The lure of beauty: People choose representations of statistical information based on attractiveness, not comprehensibility.

Wolfgang Gaissmaier, Max Planck Institute Human Development

Rocío García-Retamero, Universidad de Granada

Both experts and laypeople have difficulties in understanding health statistics. Graphical representations improve understanding for some people, whereas others are actually better off with mere numbers. When given a choice between a numerical and a graphical representation, will people choose the representation they understand better or the one they perceive as more attractive?

Method

Participants (N = 160) answered questions based on a graphical or numerical representation of health statistics. They were randomly assigned to being allowed to choose between representations or receiving one at random. We assessed comprehension, recall, and subjective accessibility of the information as well as perceived attractiveness of the representation. We also assessed graph literacy and numeracy.

If people chose the representation they understood best, people who chose graphs should have higher graph literacy and people who chose numbers should have higher numeracy. Also, comprehension, recall and accessibility should be higher when people are allowed to choose. Alternatively, it may be that perceived attractiveness determines the choice.

Results

People who chose graphs did not have higher graph literacy, and people who chose numbers did not have higher numeracy. Neither comprehension and recall nor accessibility differed between conditions. However, being allowed to choose resulted in higher judgments of attractiveness.

Conclusions

Participants did not choose the representation of statistical information that fostered the highest comprehension, but seemed to base their choice on perceived attractiveness. Allowing people to choose representations is therefore not a solution when the goal is to ensure that everyone receives the representation they understand best.

3. Predicting biases in highly numerate samples.

Edward Cokely, Michigan Technological University

Saima Ghazal, Michigan Technological University

Rocío Garcia-Retamero, University of Granada

First generation numeracy instruments have well-known psychometric limitations (e.g., ceiling effects). Here, we examined the extent to which the Berlin Numeracy Test (Cokely et al., 2012; www.RiskLiteracy.org) predicted decision biases even among very highly numerate professional and community samples. Participants in Study 1 (n=3990) were recruited from the newspaper De Volkskrant. In an article about statistical reasoning, we provided a website address wherein readers could complete the Berlin Numeracy Test and receive feedback about their levels of statistical numeracy. Participants also completed several decision tasks and reported demographics. A second study was conducted using a sub-sample from the Dutch Grand National Study of Mathematics (n=1457), differing only in that it included the Schwartz et al. (1997) numeracy test. Results showed that among highly numerate individuals, the Berlin Numeracy Test more than doubled the predictive power of the older numeracy test, predicting superior (1) risky decision making, (2) intertemporal choices, (3) medical judgments, and (4) metacognitive calibration. Reaction time analyses indicated that the relationship between numeracy and risky decisions was mediated by decision latency. Metacognitive calibration (i.e., overconfidence) also partially mediated the relation between numeracy and denominator neglect in medical judgment. Results showed that even highly numerate and highly educated professionals are often biased. However, those who make better decisions do not just "do the math". Instead, superior decisions often follow from complex interactions of numerical skill, elaborative encoding, and metacognitive monitoring that in turn give rise to contextualized (gist-based) representations and affective intuitions.

4. Objective, subjective, and approximate number abilities in judgments and decisions.

Ellen Peters, Ohio State University

Pär Bjälkebring, University of Gothenburg

Numeracy has been shown to be an important construct in understanding the processing of information in judgments and decisions involving numbers. However, multiple facets of numeracy appear to exist including objective numeracy ability (ONS), a subjective sense of one's abilities (SNS), and the acuity of the Approximate Number System (ANS). These constructs are moderately to highly correlated, but little research has whether their roles in judgment and decision processes can be discriminated.

In three studies, we first examined their inter-relations with gender and general intelligence in a structural-equation model. Next, we demonstrated that these three number abilities show dissociations. Individuals high vs low in ANS recalled numeric but not non-numeric information better; neither ONS nor SNS provided additional predictive power. ONS has been shown previously to be a significant predictor of risky choices in past studies. In the present study, ANS partially mediated ONS's effects, and both emerged as significant predictors; SNS did not provide any additional predictive power. The three abilities, while related, appear to be dissociable in their influences on decision processes. Subjective numeracy may relate to motivations and emotions involving the use of numeric processing; the ANS instead concerns abilities to encode/retrieve numeric information and distinguish between numeric magnitudes, and objective numeric abilities (ONS) appear to drive attention to numbers (and number comparisons) and the use of logical number-related algorithms. Each of the numeric abilities studied in this paper appears to produce different and dissociable effects in decision-related tasks. We therefore suggest that a clearer division between these abilities is needed in the literature.

5. I hate (love) math: The motivating and emotional force of subjective numeracy in numerical tasks.

Pär Bjälkebring, University of Gothenburg

Ellen Peters, Ohio State University

Numeracy is an important construct in numeric judgments and decisions. Questions exist, however, concerning best ways to assess it. A Subjective Numeracy Scale (SNS) has been proposed as a proxy for objective numeracy scales (ONS). SNS and ONS are correlated, but may not tap into identical constructs.

In our study, ONS and SNS were correlated ($r=.46$, $p<.001$). However, low- vs high-SNS

participants reported more negative feelings towards math; the correlation with ONS was not as strong. In fact, math emotion was a stronger predictor of SNS than was ONS. We investigated potentially separable effects of SNS and ONS in memory and gamble-attractiveness ratings.

In recalling numbers, we controlled for working-memory differences and found that high- vs low-SNS participants were more likely to state a recalled number than not. Among those stating a number, however, high-SNS participants (vs low) were more likely to recall incorrectly. These findings did not hold for ONS or for non-numeric memory. SNS appears linked to motivation with numbers, but not necessarily with numeric processing depth or accuracy.

If true, then SNS should relate differently than ONS to numeric judgment tasks. Participants were asked to rate the attractiveness of a gamble with or without a small loss. Previous studies indicated that high-ONS individuals (but not low) find the loss gamble more attractive than the no-loss gamble, presumably because high-ONS individuals process numbers in more depth; we replicated this effect. In addition, we found that greater SNS did not interact with condition, but was associated with greater gamble attractiveness in both conditions.

SNS, while a limited ONS proxy, has potential for understanding emotional and motivational factors in numeric decisions.

Symposium III: Evaluations from experience Q-302

Chair: Tim Rakow, University of Essex (United Kingdom) Eldad Yechiam & Ido Erev Technion - Israel Institute of Technology (Israel)

Discussant: Ido Erev

1. Loss aversion as response distortion: The complaint bias.

Ariel Telpaz, Eldad Yechiam, & Guy Hochman, Technion - Israel Institute of Technology

Loss aversion, the standard model for understanding the effect of losses, suggests that losses result in more extreme feelings, and this leads to overweighting losses in behavioral decisions. In two experiments, we question this model by examining rated feelings (on a scale of 1 to 7) during an experience-based decision task. In Experiment 1 participants performed two decision problems involving avoidable losses and unavoidable losses. In both problems, participants rated their feelings for losses as more extreme than for equivalent gains. For example, the feelings associated with a loss of 5 were on average 2.6 times more extreme (i.e., distant from the scale's

midpoint) than the feelings for a gain of 5. However, at the same time participants did not exhibit behavioral loss aversion for these losses. In Experiment 2 we used a mock polygraph setting (based on the "bogus pipeline" method) to examine the sources of this bias. The tendency to report more extreme feelings for losses was practically eliminated when participants were incentivized to give truthful reports. The results are interpreted as reflecting a tendency to complain about losses and to minimize praise of gains which is independent from the actual weighting of losses and gains.

2. The endowment effect from experience: Sellers and buyers differ in how they search for information.

Thorsten Pachur, Max Planck Institute for Human Development

Benjamin Scheibehenne, University of Basel

When constructing the subjective value of an object, people do this evaluation either from the perspective of a potential seller (when they own the object) a potential buyer (when they do not own it). How do these different perspectives affect information search? And how are characteristics of the search process linked to the subsequent evaluation? As a seller people often attach a higher value to it than as a buyer, a phenomenon known as the endowment effect. According to recent cognitive process accounts of the endowment effect, the effect is due to differences between sellers and buyers in information search. Whereas previous investigations have focused on search order and internal search processes (i.e., in memory), we used a sampling paradigm to examine differences in search termination in external search. We asked participants to indicate selling and buying prices for monetary lotteries in a within-subject design. In an experience condition, participants had to learn about the possible outcomes and probabilities of the lotteries by experiential sampling. As hypothesized, sellers tended to terminate search after sampling high outcomes, whereas buyers tended to terminate search after sampling low outcomes. These differences in stopping behavior translated into samples of the lotteries that were differentially distorted for sellers and buyers; the amount of the distortion was predictive of the resulting size of the endowment effect. In addition, for sellers search was more extended when high outcomes were rare compared with when low outcomes were rare. Our results add to the increasing evidence that the endowment effect is due, in part, to differences in predecisional information search.

3. Forgetting the past: The interplay between experience and memory span in subjective

valuation.

Nathan Ashby & Tim Rakow, University of Essex

Recent research investigating decisions from experience suggests that not all information is treated equally, with more recently encountered information being weighted more heavily in the decision process (Hertwig, Barron, Weber, & Erev, 2004). We report two studies investigating how this differential treatment of information affects subjective valuations of risky prospects, with a particular focus on the role played by individual differences in working memory capacity. Participants sampled the outcomes from gambles consisting of two non-zero outcomes (with no prior description of the payoff distributions), and indicated their valuations once they felt that they had sampled sufficiently. In Study 1 we find that a model averaging only a subset of the most recently encountered outcomes fits the data best. In Study 2 we replicate and expand on this finding by showing that the amount of information used to form valuations varies between individuals and that digit span explains a significant portion of this variation. Combined, these results indicate a direct link between cognitive capacity and information usage, providing further insight into the processes involved in the construction of subjective value.

4. Lazy or Eager: Intuitive Statistics on Sequentially Presented Data.

Marcus Lindskog, Uppsala University

Peter Juslin, Uppsala University

Anders Winman, Uppsala University

In decisions from description, probabilities and outcomes are explicitly stated and exactly known. In contrast, decisions from experience involve estimates that often need to be generated post hoc from long-term memory (LTM) at the time of judgment or decision. This, in turn, likely implies constraints on the cognitive processes, such that they have to be based on small samples of data retrieved from LTM that can be activated within working memory constraints, and that the information integration is constrained by sequential real-time properties of controlled judgment processes. In a series of studies we illustrate these properties of judgments deriving from inductive experience with a continuous numerical variable. Study I investigated if intuitive statistical judgments are formed by post hoc sampling from LTM or by abstraction during exposure. That is, are people lazy or eager statisticians? We show that while some circumstances result in an abstract representation, people generally store data in a raw format and inform

judgments by post hoc sampling from LTM. Study II extends these findings by showing that, because of working-memory-constrained sampling from a lazy representation, people will sometimes give point estimates that they know, when probed otherwise, have a low probability of occurring. Finally, Study III explores how inductive inferences from sparse data are influenced by a lazy representation and shows that the accuracy of inferences will be contingent on the shape of the underlying distribution. The studies suggest that intuitive statistical judgments on sequentially presented data are generated post hoc by sampling from LTM, resulting in judgments that are influenced by working memory and information integration constraints in a non-trivial way.

5. The ExCON: A Model of Probability Knowledge and Choice in Decisions from Experience.

Adrian Camilleri, Duke University

Guy Hawkins, University of New South Wales

Ben Newell, University of New South Wales

Gordon D. A. Brown, University of Warwick

In most everyday decisions, we learn about the outcomes of alternative courses of action through experience: a sampling process. Current models of these decisions from experience emphasize the importance of predicting choice at the expense of explaining how the sample outcomes are used to form a representation of the distribution of outcomes. Moreover, most current models fail to generalize even across quite similar forms of experience-based choice. We develop a new and simple model, the Exemplar Confusion model, which overcomes these limitations. In a novel experiment, the model was used to predict participants' choices and their knowledge of outcome probabilities, when choosing among multiple-outcome gambles. The model successfully predicted both types of data in sampling and feedback versions of the experiment. In addition we show that the model performs at least as well as other leading choice models when evaluated against benchmark data from the Technion Prediction Tournament (TPT). Our approach advances current understanding by proposing a psychological mechanism for how probability estimates arise rather than using estimates solely as inputs to choice models. Our principal conclusions are that (1) decisions from experience are best captured by models that assume an exemplar-based memory perturbed by noisy recall, and (2) that models are better constrained by trying to simultaneously capture more than one source of participant data (in our case, choice and probability knowledge).

Symposium IV: Judgmental Biases in Law Q-401

Chair and Discussant: Amos Schurr ,Department of Management Guilford Glazer Faculty of Business & Management (Israel)

1. Affirmative Action and other Group Tradeoff Policies: Identifiability of the Adversely Affected People.

Ilana Ritov, The Hebrew University of Jerusalem

Eyal Zamir, The Hebrew University of Jerusalem

When social resources are limited, improving the lot of the underprivileged comes at the expense of others. Thus, policies such as Affirmative Action (AA) – designed to increase the representation of minority people in higher education or employment – implicitly entail tradeoffs between groups. We propose that while the aversion to person- or group-tradeoffs of this sort is widespread, the identifiability of those who stand to lose is a moderating factor. In four experiments, we compared support for hypothetical AA procedures that are equivalent in terms of the overall harm and benefit that they offer, but different with respect to the identifiability of those who stand to lose from its implementation. Results support the claim that identifiability of the adversely affected people reduces support for AA policies, as well as for similar procedures that are unrelated to civil rights issues. Possible determinants of this effect are discussed.

2. A Person–Organization Discontinuity in Contract Perception: Why Corporations can Get Away with Breaking Contracts but Individuals Cannot.

Uriel Haran, Ben-Gurion University of the Negev

Most legal systems in the world follow the principle of corporate personhood, which grants organizations the same legal status as natural persons. Although debate over the notion of

corporate personhood has been fierce, whether and how this principle is applied in people's beliefs and intuitions has yet to be empirically examined. This work addresses the gap in the literature, in the context of formal contracts. While contracts are typically seen as either morally binding promises or morally neutral business instruments, this paper suggests that the identity of the signing party influences the degree to which a contract will be perceived as one or the other. Data from five experiments show that contracts of individuals are associated more strongly with promises than are contracts of organizations. As a result, breach of contract by an individual is seen as a moral transgression, but the same behavior by an organization is viewed more as a legitimate business decision. This bias can be remedied, however, by enhancing the association between an organization's contract and a promise. This can be achieved by phrasing contractual obligations in "promise" terms.

3. Do Lawyers Really Believe Their Own Hype and Should They? A Natural Experiment.

Zev J. Eigen, Northwestern University School of Law

Yair Listokin, Yale Law School

Existing research suggests that attorneys are too confident in the merits of their clients' cases. But attorneys often self select (1) the area of law in which they practice, (2) the side on which to practice within that area, (3) law firms with whom they practice, and (4) the clients they represent. We explore whether, after stripping away these selection biases, legal advocates are still overconfident in their clients' claims by exploiting a natural experiment involving participants in moot court competitions at four U.S. law schools over two years of moot court competitions. Students are randomly assigned to advocate for either petitioner or respondent, so none of the noted selection-bias problems are present. We find that following participation in moot court contests, students overwhelmingly perceive that the legal merits favor the side that they were randomly assigned to represent. We also find that overconfidence is associated with poorer performance in advocacy as measured by legal writing instructors.

4. Expertise and Accountability as Efficient Vehicles for Attenuating Judgmental Biases and Increasing Law Obedience.

Amos Schurr, Ben Gurion University of the Negev

Omer Dekel, The College of Law and Business, Israel

Simone Moran, Ben-Gurion University of the Negev

In the present research we challenge the notion emerging from a vast amount of previous work that experts are as vulnerable to judgmental biases as are laypeople (e.g., Tversky & Kahneman, 1973; Northcraft & Neale, 1987; Frederick, 2005). Across a series of studies we demonstrate that professional members of bidding committees are less biased in real-life contexts pertaining to their expertise. We further explore potential psychological mechanisms underlying these differences, and discuss the roles of experience, expertise and accountability in attenuating these judgmental biases.

5. Priming Ideology? Electoral Cycles Without Electoral Incentives Among Elite U.S. Judges.

Daniel L. Chen, Center for Law and Economics. ETH Zurich

Carlos Berdejó, Loyola Law School

Economists generally view incentives as determining behavior. We document large, economically important changes of behavior occurring even in the absence of incentives. Using all 293,868 cases from 1950–2007 on the U.S. Courts of Appeals and a detailed 5% random sample from 1925–2002, we show that setting precedent reflecting the political views of judge's party of appointment, partisan voting, and dissent rates, all double just before presidential elections. The changes in behavior are not attributable to shifts over the electoral cycle in case or litigant characteristics nor are they attributable to shifts in characteristics of judges either authoring or sitting on the case. We test and reject incentive-based reasons for these changes in behavior and find evidence consistent with priming. Changes in behavior are concentrated among judges sitting in electorally pivotal states and in media markets where campaign advertisements are greatest. Dissents by judges coincide with the monthly increase of campaign advertisements in their states of residence and with the closeness of the state's popular vote when that state has more electoral votes. Ideologically polarized environments and inexperience magnify the effect of proximity to presidential elections, while war has a unifying effect, especially in polarized environments and among inexperienced judges. The electoral cycles we document are significantly larger and more robust than previously-documented electoral cycles by politicians with electoral incentives.

Symposium V: Causal Judgment, Responsibility and Moral Psychology Q-402

Chair: Denis Hilton

Discussant: Barbara Spellman

1. A counterfactual model of responsibility attributions in groups.

Tobi Gerstenberg, Massachusetts Institute of Technology

Attributions of responsibility play a critical role in many group interactions from Olympic team sports to scientific collaborations. In this talk, I present a general framework of how people attribute responsibility to individuals in groups. In this framework, people's responsibility attributions are modeled in terms of counterfactuals defined over a causal representation of the situation. A person is predicted to be held responsible to the extent that their action made a difference to the outcome. Accordingly, when attributing responsibility we compare what actually happened with the outcome in a simulated counterfactual world in which the person's action had been different. However, a person can still be held responsible for an outcome even if their action made no difference in the actual situation. Responsibility attributions are sensitive to whether a person's action would have made a difference in similar counterfactual situations. Generally, responsibility decreases with the number of events that would have needed to change from the actual situation in order to generate a counterfactual situation in which the person's action would have been pivotal. In addition to how close a person was to being pivotal, responsibility attributions are influenced by how critical a person's action was perceived prior to the outcome. The predictions of the framework are supported by the results of a series of experiments which systematically varied the group structure and performances of the group members. Both pivotality (i.e. how close a person's contribution was to making a difference to the outcome) and criticality (i.e. how important a person's contribution was perceived for the team's success) influenced responsibility attributions.

2. Facts, events and outcomes: How event description and causal structure constrain counterfactual reasoning and judgments of actual cause.

Denis Hilton, Université de Toulouse

Christophe Schmeltzer, CLLE-LTC Toulouse

Causal pre-emption scenarios pose an important challenge for the counterfactual framework of causation (CFC), but there has been little empirical investigation of the role of event description and causal structure in determining relevant judgments. In a first experiment using a classic symmetric causal pre-emption scenario, we show that when the target event described in the counterfactual probe is described in general terms (events), participants generate counterfactuals that mention both the pre-empting (actual) and pre-empted causes, but when the target event is described in specific terms (facts), participants only undo the actual cause (as predicted by CFC). Further experiments introduce modified pre-emption scenarios (causal chains), where the pre-empting cause is described as being causally dependent on the occurrence of the pre-empted cause, or both are described as being dependent on a common distal cause. As predicted by CFC, participants identify as actual cause those events that are in the actual causal chain, and undo these causes in response to counterfactual questions. However "outcomes" are interpreted as specific results rather than generic events in classic causal pre-emption scenarios but not ones where the pre-empting and pre-empted causes are caused by a common distal cause. Finally, participants show a strong preference for attributing responsibility and blame to actual causes in both experiments. The results are interpreted as supporting the counterfactual analysis of causation (augmented with a theory of event description and causal structure), and as showing its relevance to attributions of responsibility and blame.

3. Moral Obligations in the Global Village: How Do Availability and Location of Means Influence Judgments of Helping Obligation?

Jonas Nagel, University of Göttingen

Michael Waldmann, University of Göttingen

Availability of technical means make modern humans increasingly efficacious in helping distant needy strangers. Different ways have been proposed in which this pervasive trend can influence judgments of helping obligations. First, the availability of means could lead to perceptions of increased efficaciousness that could in turn directly increase an agent's sense of obligation. Second, spatial proximity per se between the agent's means and the victim could increase the agent's sense of obligation to let his means be used even if he is personally far away (Kamm, 2007). It turns out that these two distinct claims cannot easily be empirically separated because the notions of means, efficaciousness, and spatial distance stand in a complex interrelation that has not been thoroughly analyzed previously. We introduce a refinement of the concept of means, distinguishing two different functions that means can have in relation to spatial distance. Based on this analysis, we report two experiments in which the distance between the victim and a specific kind of means is deconfounded from efficaciousness and other natural confounds of spatial proximity. We demonstrate that proximity of means is only seen as morally relevant to the extent to which it is indicative of its natural confounds. We conclude that spatial proximity of means may appear to matter morally in some cases, but that its effects actually stem from naturally confounded factors, including but not limited to increased efficaciousness. To the extent to which technical advances in modern times continue to annihilate the practical implications of spatial distance, distance itself can thus be expected to lose its intuitive moral force.

4. Causal Deviance and Culpable Control.

Mark D. Alicke, Ohio University

David Rose, Carnegie Mellon University

People who set out to accomplish one set of goals may accomplish very different ones, or achieve their intended effects in unintended ways. We refer to these action sequences as "deviant causal chains." We applied the Culpable Control Model (CCM) of blame to two problems of this type. The CCM assumes that when people assess the control elements of an event (voluntariness, purpose, causation and foresight) they automatically evaluate the actor, his or her actions, and the consequences that ensue. These evaluations are elided into assessments of control such that an actor who arouses the observer's disapprobation will be seen to have exerted greater intent, causal influence, and foresight for actions that produce, or that could potentially have produced, harmful outcomes. We studied two different problems from this perspective. The first involved achieving a desired effect through causal means that had a very low probability of success, but that actually did succeed. Participants ascribed greater intent,

desire and belief to a woman who was described less sympathetically. The second problem pertained to a woman who fired a warning shot at an intruder that unexpectedly came very close to killing him. Consistent with the CCM, participants believed that a woman who was described in more negative terms came closer to killing the victim than a woman who was characterized more positively.

				Tuesday 20th			
9.00am-10.00am	<p>KEYNOTE ADDRESS II: Irrational exuberance and neural warning signals during endogenous experimental price bubbles.</p> <p>Colin F. Camerer, California Institute of Technology, USA</p> <p>Aula magna</p>						
10.00am-10.45am	<p>Jane Beattie Award Presentaion</p> <p>Dr. Mirta Galesic</p> <p>Social Sampling Explains Apparent Biases in Social Cognition</p> <p>Aula Magna</p>						
10.45am-11.15am	Coffee Break						
11.15am-1.15pm	<p>POSTER SESSION</p> <p>Q-100</p>						
1.15pm-2.15pm	Lunch (South Campus)						
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401	Q-402
2.15pm-4.15pm	Uncertainty and Probability (III)	Choice (III)	Social Aspects in JDM (III)	Judgement and Intuition (III)	Other topics (II)	Symposium VI: Improving Judgments and Decisions I – Groups and Crowds	Consumer JDM (II)
	Chair: Charles F. Manski	Chair: David Tannenbaum	Chair: Lenka Kostovičová	Chair: Ilan Fischer	Chair: Matt Twyman	Chair and Discussant: Emre Soyer	Chair: Jamel Khenfer
	First- and Second-order Subjective Expectations in Strategic Decision-Making: Experimental Evidence. Charles F. Manski & Claudia Neri	Partitioning option menus to nudge single-item choice. David Tannenbaum, Craig R. Fox, Noah J. Goldstein, & Jason N. Doctor	Let's think it through: Effects of accountability and responsibility on risk attitude are partially mediated by cognitive reflection. Lenka Kostovičová, Katarina Dudeková, Miroslav Sirota, & Viera Bačová	The decision to shoot or to hold fire: Subjective Expected Relative Similarity and its capacity to predict hostile behaviors. Ilan Fischer & Maayan Armelin	Effects of autocorrelation and task order on forecasting and change detection in time series. Matt Twyman, Nigel Harvey, & Maarten Speekenbrink	Kind and wicked experience. Robin M. Hogarth	Out of control: impact of goal structure on personal control and implications for consumer judgments. Jamel Khenfer
	Forecasting Future Values of Quantitative Variables. Thomas S Wallsten, Colette Nataf, Yaron Shlomi, & Tracy Darlene Tomlinson	Preferences over Sequences – Empirical Results from Musical Sequences. Manel Baucells, Daniel P. Smith, & Martin Weber	Is it all about the self? Cognitive control of ultimatum game proposer. Elican Halali, Yoella Bereby-Meyer, & Axel Ockenfels	The Narrow Interpretation Conjecture Meets the Planning Fallacy. Barbara Summers	How to prevent competitive escalation in the minimal dollar auction paradigm. Sebastian Hafenbrädl & Jan K. Woike	Improving group cooperation using neural "mechanism design". Colin Camerer, Ian Krajbich, John Ledyard, & Antonio Rangel	The Effect of 'Giving it all up' on Valuation: A New Look at the Endowment Effect. Amos Schurr & Ilana Ritov
	Forecasting Quality in Strategic Intelligence. David R. Mandel	Reversal of Risky Choice in a Good versus a Bad World. Einav Hart, Yaakov Kareev, & Judith Avrahami	Moral Licensing and Goal Regulation. Erik Hoelzl, Moritz Susewind, & Gari Walkowitz	The relationships between intuitive abilities and cognitive styles. Agata Sobków, & Czesław S. Nosal	Pricing decisions from experience and their correspondence to pricing decisions from description and choice decisions from experience. Eyal Ert & Hagai Golan	The Wisdom of Small Crowds. Albert Mannes, Jack B. Soll, & Richard P. Larrick	The price of in situ information: value judgements across situations and elicitation methods. Bernadette Kamleitner, Hamed Haddadi, & Stephan Dickert
	Increased interactivity and numeracy foster Bayesian reasoning. Gaëlle Villejoubert, Frédéric Vallée-Tourangeau, & Marlène Abadie	Set-fit effects in choice. Ellen R. K. Evers, Yoel Inbar, & Marcel Zeelenberg	Navigating the Social Environment: An Ecological Rationality Perspective on Advice Taking Behavior. Juliane Eva Kämmer, Pantelis Piperigias, Analytis, Mehdi Moussaïd, & Hansjörg	Using Intuitive Causal Models to Determine the Predictive Value of Cues. Ana Sofia Morais, Henrik Olsson, Lael Schooler, & Björn Meder	Stopping rules and the perceived value of information cues. Richard Szántó & Bálint Esse	The benefits of the wisdom of crowds in hedonic prediction. Johannes Müller-Trede, Shoham Choshen-Hillel, Meir Barneron, & Ilan Yaniv	Prominence versus Dominance. Ioannis Evangelidis & Jonathan Levav
	Long Versus Short-term Aspirations in Decisions from Experience. Dirk Ulrich Wulff	Allais-Paradox and Regret Theory in practical experiments with managers – (ir)rational behavior in the wild. Lars Klostermann	Real-life Decision-Making Competence. Martin Geisler & Carl Martin Allwood	Productivity increases, suboptimal resource allocations and the time saving bias. Ola Svenson	Time-Tradeoff Sequences for Analyzing Time Inconsistency for Health and Money. Han Bleichrodt, Yu Gao, & Kirsten Rohde		On the Gap Between Preference and performance. Idan Zelikovich
	Envisioning the Improbable: Distributional Knowledge and Judgment in Heavy-Tailed Contexts. Shellwyn Weston	The Effect of Cognitive Load on Economic Decision Making. Cary Deck & Salar Jahedi	How Expectations and their Violations Affect Decision Making. Cinzia Giorgetta	Why 100 once is worse than 10 times 10: Dread risks versus "continuous" risks. Nicolai Bodemer, Azurra Ruggeri, & Mirta Galesic	Ritalin and trust in decision-making. Catalina E. Ratala		
4.15pm-4.45pm	Coffee Break						

				Tuesday 20th			
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401	Q-402
	Uncertainty and Probability (IV)	Choice (IV)	Social Aspects in JDM (IV)	Symposium VII: Advances in the use of directed attention to understand and predict human behavior	Symposium VIII: Network-Bounded Rationality: How Social Structure Influences Sampling, Judgment and Learning	Symposium IX: Improving Judgments and Decisions II - Individual Decision Making	Symposium X: Emotions and Decision Making
	Chair: Yvette van Osch	Chair: Martin Schonger	Chair: Uriel Haran	Chair: Nathaniel Ashby & Susann Fiedler Discussant: Andreas Glöckner	Chair: Chengwei Liu & Jerker Denrell Discussant: Ralph Hertwig	Chair and Discussant: Emre Soyer	Chair: Benjamin Scheibehenne & Bettina von Helversen Discussant: Ellen Peters
	Lower precise monetary estimates are sometimes more attractive than higher round estimates. Yvette van Osch & Job van Wolferen	Social Preferences or Sacred Values? Theory and Evidence of Deontological Motivations. Martin Schonger & Daniel Li Chen	Know who you're up against: Counterpart identifiability enhances competitive behavior. Uriel Haran & Ilana Ritov	The leaky mind: The role of attentional allocation, primacy, and "forgetting" in choice. Nathaniel J. S. Ashby, Andreas Glöckner, & Marc Jekel	On Rational Inferences in Nested Structures. Florian Kutzner, Klaus Fiedler, & Tobias Vogel	The surprise of being helped: a comparison of medical and consumer choices made with different choice architectures. Elena Reutskaja & Barbara Fasolo	Selecting Decision Strategies: the Differential Role of Emotions. Scheibehenne & von Helversen
	Making Case-Based Decision Theory Directly Observable. Han Bleichrodt	The wavy impact of experience. Ido Erev	The Hidden Cost of Insurance: When Decreasing Risk Decreases Cooperation. Philippe van de Calseyde, Gideon Keren, & Marcel Zeelenberg	Social Value Orientation and information Search in Social Dilemmas: An Eye-Tracking Analysis. Susann Fiedler, Andreas Glöckner, Andreas Nicklisch, & Stephan Dickert	Partial Diffusion Is an Unreliable Indicator of Quality When the Matthew Effect Is Bounded by Cliques. Chengwei Liu, Nick Chater, Jerker Denrell, & Thomas House	Guided Decision Processes. Manel Baucells & Rakesh K. Sarin	Probabilistic inferences under Emotional Stress: Arousal, Attention Narrowing and Decision Strategy Selection. Wichary, Mata, & Rieskamp
4.45pm-6.45pm	My Confidence in Your Judgement is Better Than Yours -and Vice Versa!: Swapping Judgements Improves Calibration. Aidan Lyon	Using personalized recommendations to understand the role of diversity on choice overload. Martijn Willemsen, Mark Graus, & Bart Knijnenbrug	Standing United or Falling Divided? High Stakes Bargaining in a TV Game Show. Dennie van Dolder, Martijn J. van den Assem, Colin F. Camerer, & Richard H. Thaler	Accounting for Attention in Temporal Decision Making. Ana M. Franco-Watkins	Social Learning in Complex Networks. Daniel Barkoczi, Mirta Galesic, & Konstantinos Katsikopoulos	Creativity in Judgment and Choice. Craig R. M. McKenzie	The Influence of Stress on Financial Risk Taking Depends on the Level of Risk. von Helversen & Rieskamp
	Ownership status and the representation of assets of uncertain value: The Balloon Endowment Risk Task (BERT). Lukasz Walasek, Rebecca J. Wright, & Tim Rakow	Virtues and Vices in Monetary Tradeoffs: Evidence of Comparative Mental Accounting in Intertemporal Choice. Marc Scholten	Taking pleasure in pain: Why good people enjoy punishing. Katrina Marie Fincher & Philip E. Tetlock	New measurement and metrics for quantifying information search via eye-tracking. Joseph G. Johnson	Sampling Popular Alternatives can Lead to Collective Illusions. Gaël Le Mens & Jerker Denrell	Illusory correlation in the remuneration of chief executive officers: It pays to play golf, and well. Gueorgui I. Kolev & Robin M. Hogarth	Does an Expectation Calculus Govern Affect-Rich Risky Choice? Suter, Pachur, Hertwig, & Biele
	Rethinking the role of intuition in probability judgements: Thinking mode dispositions and time pressure. Jennifer Faure-Bloom, Gaëlle Villejoubert, & Frédéric Vallée-Tourangeau	Zeroing in on the "hidden zero" effect. Daniel Read	Giving and justifying self-interested advice. Ilan Yaniv, Shoham Choshen-Hillel, Meir Barneron, & Chen Pundak	The Role of Visual Attention in Decision Making. Jacob Lund Orquin & Simone Müller Loose	Similarity, Organizational Clustering, and Simple Identities. Christina Fang, Ji-hyun (Jason) Kim, & Joe Porac	Improving probabilistic inference in competitions. Emre Soyer & Robin M. Hogarth	Expected Risks and Returns in Children's, Adolescents' and Adults' Risky Choice: Behavioral Effects and Neural Correlates. Figner, Van Duijvenvoorde, Somerville, Powers, Weeda, Delgado, Casey, Weber, & Huizenga
			Why often-heard things tend to be true: The ecological rationality of the truth effect. Stefan Michael Herzog, Christian Unkelbach, Ralph Hertwig				

Tuesday 20th

10.00am-10.45am

Jane Beattie Award Presentation



Dr. Mirta Galesic

Social Sampling Explains Apparent Biases in Social Cognition

Aula Magna

The EADM is pleased to announce that Jane Beattie Scientific Recognition Award for 2013 has been awarded to Dr **Mirta Galesic** in recognition of her "innovation in decision research," as broadly understood with the SPUDM tradition. The committee that conferred the award consists of Nicolao Bonini (chair), Barbara Fasolo, Danny Oppenheimer (the 2011 winner) and Fergus Bolger.

Mirta Galesic received her PhD in psychology from University of Zagreb (Croatia). She is currently a Research Scientist at the Center for Adaptive Behavior and Cognition, Max Planck Institute for Human Development in Berlin, Germany. She studies social judgments and social learning, risk communication, financial and environmental decision making, and web research methods.

Parallel Sessions

2.15pm–4.15pm

Uncertainty and Probability (III) Q-101

Chair: Charles F. Manski

1. First- and Second-order Subjective Expectations in Strategic Decision-Making: Experimental Evidence.

Charles F. Manski, Northwestern University

Claudia Neri, University of St. Gallen

We study first- and second-order subjective expectations (beliefs) in strategic decision-making. We propose a method to elicit probabilistically both first- and second-order beliefs and apply the method to a Hide-and-Seek experiment. We study the relationship between choice and beliefs in terms of whether observed choice coincides with the optimal action given elicited beliefs. We study the relationship between first- and second-order beliefs under a coherence criterion. Weak coherence requires that if an event is assigned, according to first-order beliefs, a probability higher/lower/equal to the one assigned to another event, then the same holds according to second-order beliefs. Strong coherence requires the probability assigned according to first- and second-order beliefs to coincide. Evidence of heterogeneity across participants is reported. Verbal comments collected at the end of the experiment shed light on how subjects think and decide in a complex environment that is strategic, dynamic and populated by potentially heterogeneous individuals.

2. Forecasting Future Values of Quantitative Variables.

Thomas S Wallsten, Department of Psychology University of Maryland, USA

Colette Nataf, University of Maryland

Yaron Shlomi, Shenkar College of Engineering and Design

Tracy Darlene Tomlinson, University of Maryland

Decision makers (DMs) often rely on forecasts of quantitative variables, such as the dollar-euro

exchange rate 6 months hence, GDP growth over the next quarter, or how long before a country achieves nuclear weapon capability. Point estimates are not very useful. Interval estimates are better, but tend to be overconfident, i.e., too tight. Full subjective probability distributions are preferable: They are most informative to DMs and they force judges to think more deeply and therefore possibly more accurately. We develop and compare easy-to-implement methods for eliciting full distributions. In all cases, forecasters judge a few points along the variable and the judgments are fit with a suitable distribution, which serves as the subjective forecast. Two web-based experiments compared variants of the procedure in terms of speed, difficulty, precision and accuracy. In one experiment, respondents judged ratios of areas of geometric figures and in the other they forecasted real future events. We selected the problems so as to cover three types of quantitative variables: bounded at 0, bounded at both 0 and 1, and unbounded. Independent variables nested within problems were number of judgments (3 or 5), quantity being estimated (probabilities corresponding to fixed quantiles or quantiles corresponding to fixed probabilities), and within the fixed-quantiles, type of probability estimate (cumulative or interval). Within problem type, we compared various relevant distributions. Appropriate distributions provided excellent fits. Judgments of cumulative probabilities were quickest, rated as easiest and yielded the most accurate and tightest distributions. There were advantages to eliciting 5 rather than 3 judgments, although even 3 did surprisingly well

3. Forecasting Quality in Strategic Intelligence.

David R. Mandel, DRDC Toronto

Intelligence agencies often rely on process-based measures of performance during normal periods of operation, but few, if any, implement objective scoring rules to measure forecasting quality where predictions are made in intelligence reports. The reported study represents a rare exception in which the performance of a regional intelligence division was assessed over several years using standard, quantitative measures of judgment quality, such as calibration, discrimination, and difficulty-adjusted skill measures. In the study, 1,075 classified predictions from Canadian government Intelligence Memoranda were statistically analyzed. Forecasts were expressed on a 0/10-10/10 certainty scale. Predictions were well calibrated ($CI = .014$), had good discrimination ($ANDI = .68$), and were 92% correctly classified. Analysts were under-confident across most of the certainty scale with the exception of some overconfidence at the extremes. Senior analysts were better than junior analysts at correctly discriminating event occurrences from non-occurrences, despite handling more cases deemed of high-importance to policy decision makers. Overall, the findings reveal an impressive level of forecasting quality that might

not have been inferred either on the basis of past psychological literature on calibration and overconfidence or on the basis of "failure-of-imagination" and other (usually post-mortem) characterizations of intelligence analysis. Intelligence directors could use the sorts of quantitative methods invoked in the reported research to systematically track prediction quality within their organizations, and analysts could do so at an individual level. Doing so could confer many benefits to analysts, directors, and ultimately the consumers of intelligence products.

4. Increased interactivity and numeracy foster Bayesian reasoning.

Gaëlle Villejoubert, Kingston University

Frédéric Vallée-Tourangeau, Kingston University

Marlène Abadie, Université de Toulouse

Ideally, we should be able to reason appropriately with uncertain information. In reality, research has shown that reasoning under uncertainty is often flawed and intervention efforts designed to improve Bayesian reasoning performance have met with mitigated success. Over the years, the accumulated evidence has tended to suggest that people's poor performance in tasks requiring them to draw inferences based on statistical information is mainly due to reliance on heuristic thinking, as a result of their general lack of numeracy skills, lower cognitive abilities, or lack of motivation to engage in effortful thinking. We surmised, instead, that participants' struggle to engage in Bayesian reasoning, together with researchers' mitigated success in helping participants overcome their difficulties, originates from the material resources customarily used to present information in Bayesian problems—namely, paper-and-pencil questionnaires—because such resources severely constrain what participants can do to discover the correct solution. We report a series of three experiments showing that performance can be substantially improved when material resources afford richer interactions with the probabilistic information presented in the problems, independently of the information format used and without training. We conclude by discussing the implication of adopting a distributed cognition approach to better understand how people's actual thinking capability may be realised within and outside the laboratory.

5. Long Versus Short-term Aspirations in Decisions from Experience.

Dirk Ulrich Wulff, Max Planck Institute for Human Development

Do people adapt their decisions depending on whether their consequences are short-term or long-term? Relatedly, do people adopt different search policies prior to making such short or long-term decisions? We investigated decisions from experience by framing and implementing choice environments as having either one-shot (short-term) or multi-shot (long-term) payoffs. This manipulation changed both search and choice. Specifically, people searched more in the long-term than in the short-term environments. Moreover, choices in the long-term environments were more consistent with expected value maximization as compared to short-term environments. We argue that the interlinked change in search and maximization over these environments poses a problem for expected-utility theory and is better explained by a choice criterion based on aspiration. We further compared the results with those obtained in a frequently used paradigm in research on decisions from experience, the sampling paradigm. Choice and search behavior in this paradigm predominantly matched the behavior observed in the short-term payoff environment. This suggests that evaluating decisions from experience relative to 'optimal' long-term expected value may overlook how people construe payoff environments as being either short or long-term in nature.

6. Envisioning the Improbable: Distributional Knowledge and Judgment in Heavy-Tailed Contexts.

Shellwyn Weston, NYU - Stern School of Business

This work examines the judgments individuals make regarding possible extreme (low-probability/high-consequence) events in heavy-tailed contexts in the absence of representative experience and finds that a vast majority of subjects exhibit a bias, which leads to significant underweighting. Heavy-tailed distributions often characterize contexts of great importance to decision-makers (e.g., branded product sales, asset prices, and environmental phenomena) in which extreme events occur relatively frequently. If these contexts are mistakenly characterized as thin-tailed (i.e., contexts where extreme events are exceedingly rare), people may dismiss potential blockbuster opportunities, undervalue assets, or fail to plan adequately for catastrophic events. Due to their structure, heavy-tailed random processes often exhibit non-representative samples that observationally appear thin-tailed (due to an absence of outliers), thereby inducing biased misclassification. Several experiments demonstrate that individuals fail

to distinguish between heavy- and thin-tailed contexts in the absence of experience and that contextual knowledge (the understanding that sample data may be misleading) moderates the bias. Employing skewed payoff structures; I introduce a new method for eliciting confidence appropriate for heavy-tailed contexts and demonstrate that the "willingness to sell tail risk" is significantly correlated with biased judgments. Counterintuitively, statistical knowledge beyond the Bell Curve does not appear to attenuate the bias. This is the first work to develop a typology of distributional knowledge, model and test individual ability to distinguish heavy- from thin-tailed contexts, and elicit perceptions of tail risk appropriate for heavy-tailed contexts.

Choice (III) Q-102

Chair: David Tannenbaum

1. Partitioning option menus to nudge single-item choice.

David Tannenbaum, UCLA Anderson School of Management

Craig R Fox, UCLA Anderson School of Management

Noah J. Goldstein, Anderson School of Management

Jason N. Doctor, USC School of Pharmacy.

Three studies demonstrate a new decision architecture tool for single-item riskless choice – partitioning option menus. The number of options comprising a choice-set can be organized in any number of ways; we show that whenever options are individually listed out or “unpacked” they are more likely to be chosen than when those same options are grouped into a superordinate category. These partitioning effects occur both in laboratory and field settings, when participants are experts in the task domain, and when participants are motivated to accurately state their preferences.

2. Preferences over Sequences – Empirical Results from Musical Sequences.

Manel Baucells, RAND Corporation

Daniel Smith, University of Mannheim

Prof. Dr. Dr. h.c. Martin Weber, University of Mannheim

Empirical insight on both individual and representative agent choice concerning time preferences over sequences of music as an example of a homogeneous good of varying quality.

Method:

Two novel data sets from social media websites (Wikipedia and Last.fm) collected by the authors encompassing track lists for 1'420 individual concerts (Wikipedia) correlated with relative Wikipedia article length for each individual song as a measure of perceived quality and 1.5 million user generated playlists of songs (Last.fm) correlated with information on favorite songs for every user are analyzed concerning placement and ordering of preferred and less preferred songs in order to obtain an overview of intertemporal choice under certainty.

Results:

Results tie very closely with the stylized facts of the satiation model, of which a new version is forthcoming by the same authors: A clear gulp-sip-gulp structure is visible in both data sets, with the higher-ranked or individually preferred songs being placed at the initial or final point in any sequence with a higher probability than in the middle. There is no statistically significant support for increasing, decreasing, hump-shaped or other conceivable sequences, but instead statistically highly significant support for sequences with an increased likelihood of preferred elements exclusively at the ends of the sequence; contrary to much of the literature restricted to small-scale experimental results, the large sample size allows for very precise statistical analysis at a high confidence level.

Interpretation:

Individual intertemporal choice in this setting can to a large extent be characterized almost exclusively by a preference for preferred elements at either or both ends of the sequence, with no significant structure in the sequence interior.

3. Reversal of Risky Choice in a Good versus a Bad World.

Presenting Author: Einav Hart, The Center for the Study of Rationality, Hebrew University of Jerusalem, Israel

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Yaakov Kareev, the Center for the Study of Rationality, Hebrew University of Jerusalem, Israel

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In many situations one has to choose between risky alternatives, knowing only one's past experience with these gambles. Such decisions can be made in more – or less – benevolent settings or 'worlds'. In a 'good world', high payoffs are more frequent than low payoffs – and vice versa in a 'bad world'. Different predictions concerning risk preferences in the various worlds arise from different accounts of what drives choices – be it received rewards, comparisons of the received payoff to other payoffs within the chosen gamble (which may lead to disappointment), or comparisons between the received and the forgone payoffs (which may lead to regret). To compare the accounts, we explored in two studies whether and how choices are affected by the world in which they are made. Subjects made repeated, incentivized choices between two gambles, one riskier than the other, neither offering a sure amount. Worlds were manipulated both between- and within-subjects: In Study 1 each subject experienced one world – good, bad or mediocre; in Study 2 each subject experienced both a good and a bad world. We examined both aggregate behavior (choice rates), and round-by-round dynamics. We observed a significant effect of the world on the aggregate behavior in both studies: In a good world, subjects tended to choose the riskier alternative, and vice versa in a bad world. Choice dynamics were independent of world, and best explained by reactions to the forgone reward: The rate of choice repetition was lower when the counterfactual reward was larger than the received reward. The pattern of results – both aggregate and dynamic – is thus in line with a regret based account. The impact of regret can, in turn, explain the effect of the world on preference for risk or variance.

4. Set-fit effects in choice.

Ellen R. K. Evers, Tilburg University

Yoel Inbar, Tilburg University

Marcel Zeelenberg, Tilburg University

Even though rational choice theory assumes that people have stable preferences, in reality this assumption is sometimes violated. We show how the context of a set influences choice and preferences. Based on literature on knowledge from gestalt psychology and research on

evaluation of patterns, we expected that people have a notion of a "good" set. A good set is one in which all the contents are either completely similar or completely dissimilar on every salient feature. The consequence of this is that choices do not only reflect a person's preferences for the individual items but also take set-fit into account leading to predictable preference reversals. In four studies we consistently find that choice between two individual items is different from choice between the exact same two items when we add the same context-items to both options, even though the added items are not complementary. To clarify; people choose *B* over *A*, but prefer *AAAA* over *BAAA* (all similar) and prefer *ABCD* over *BBCD* (all completely different).

The set-fit effect is so strong that people are likely to choose inferior items when they fit the set better over objectively superior items that do not fit, even in a competitive context. Responses by the participants when inquired about the reasons for their choice suggest that this is a very intuitive effect. This idea was confirmed in a follow-up study in which we found that people are less likely to choose a good-fitting but inferior set over a bad-fitting superior one after careful deliberation.

These findings show that the perceptual complexity of sets can have profound influences on preference and choice, sometimes even leading people to choose inferior options over superior ones. Practical and theoretical implications will be discussed.

5. Allais-Paradox and Regret Theory in practical experiments with managers – (ir)rational behavior in the wild.

Lars Klostermann, University of Oldenburg

Allais, M. (1952) showed in his laboratory experiments that the independence axiom as defined in the Expected Utility Theory (EUT) based on von Neumann, J.; Morgenstern, O. (1953) doesn't hold. He extracted the common ratio effect (CRE) and the common consequence effect (CCE) as two examples of irrational behaviour (Allais-Paradox). In the following years a broad variety of approaches has been developed to explain the people's behaviour differing from the EUT. Broadening the EUT the Regret Theory (RT) from Loomes, G.; Sugden, R. (1982) takes into account the interdependencies of acts and their consequences in pair wise choices. The RT is based on the axioms of the Subjective Expected Utility Theory (SEUT) from Savage, L. J. (1954). It explains the CRE and the CCE via the dependency between the consequences of acts which leads to feelings of regret and elation for the decision maker.

During the last decades a lot of laboratory choice experiments had been carried out to test the independence axiom and alternative theories to the EUT. Most of the results verified the findings

from Allais, M. (1952) and the RT. Besides there is an intensive discussion about the external validity of this results. This article reports about an experiment based on practical decision situations and carried out within a group of specialised managers. The results show in contrast to past laboratory experiments that there is no significant Allais-Paradox behavior. Moreover in the experiment the RT doesn't perform significantly better than the EUT. The direct measures of external validity in the study show that the experimental setting fits to real world situations. Based on a very stringent design of the experiment there are only few threats to internal validity.

6. The Effect of Cognitive Load on Economic Decision Making.

Cary Deck, University of Arkansas

Salar Jahedi, University of Arkansas

Research in psychology suggests that human behavior is the product of two processes in the brain: the 'reasoning' system and the 'intuitive' system. It is thought that when the reasoning system is bogged down, it will not be able to correct mistakes made by the intuitive system. We test this theory by seeing how memorizing numbers of different lengths affects subjects' answers to: (1) arithmetic problems, (2) choices involving varying risk, (3) choices over time, and (4) choices with framing effects. We find that longer number memorization leads to more math mistakes, less risk-taking, more impatience, and more anchoring.

Social Aspects in JDM (III) Q-103

Chair: Lenka Kostovičová

1. Let's think it through: Effects of accountability and responsibility on risk attitude are partially mediated by cognitive reflection.

Lenka Kostovičová, Slovak Academy of Sciences, Bratislava, Slovakia

Katarína Dudeková, Slovak Academy of Sciences, Bratislava, Slovakia.

Miroslav Sirota, King's College London, UK; a regular member of EADM

Viera Bačová, Institute of Experimental Psychology, Slovak Academy of Sciences, Bratislava, Slovakia

Social influences on decision making under risk have been repeatedly demonstrated, however the nature of mechanisms behind the particular effects is less clear. Recent research has suggested that adding social aspect of accountability improves decision making because considering social context activates analytical thinking and suppresses intuitive responses; however, experimental evidence is still missing. Therefore, we aim to test whether the social context affects decision making under risk via increased cognitive reflection.

Method: In two experiments presented here ($N = 256$), we investigated effects of accountability and responsibility on risk attitude parameters within choices in prospect tasks and a simple lottery task, through Cognitive Reflection Test scores as a mediator. Accountability was manipulated by the instruction that choices could be anonymously evaluated, disclosed or justified. Responsibility was manipulated by asking participants to make decisions either on behalf of themselves or also on behalf of a passive recipient.

Results: Accountability reduced loss aversion and the effect was partially mediated by cognitive reflection. Responsibility amplified probability weighting with full mediation effect of cognitive reflection. Additional results of social influences on risk attitude parameters through cognitive reflection were found, while the actual direct effects were absent.

Conclusions: We conclude that the influences of accountability and responsibility on decision making under risk can be partially explained by cognitive reflection in terms of higher cognitive effort, inhibiting intuitive responses and engaging in analytical thinking. We discuss conceptual and methodological implications of our findings.

2. Is it all about the self? Cognitive control of ultimatum game proposer.

Eliran Halali, Ben-Gurion University of the Negev

Yoella Bereby-Meyer, Ben-Gurion University of the Negev

Axel Ockenfels, University of Cologne

We manipulated the availability of cognitive-control resources among ultimatum-game proposers to test whether preference for fairness is a deliberative cognitive-controlled act or an automatic act. In this game, as in many real-life social exchange situations, the selfish motive to maximize own gains conflicts with fairness considerations. In two experiments we found that ego-depleted proposers chose the equal split significantly more often than non-depleted proposers. These results can be interpreted as resulting either from a greater concern for

fairness under ego depletion, or from a greater fear of rejection, which would be in line with a purely self-interested response. To distinguish between these competing explanations, we conducted a dictator-game in which the responder cannot reject the offer. In contrast to the increased fairness behavior demonstrated by depleted ultimatum-game proposers, we found that depleted dictator-game allocators chose the equal split significantly less often than non-depleted allocators. We discuss different explanations for these results.

3. Moral Licensing and Goal Regulation.

Erik Hoelzl, University of Cologne, Germany.

Moritz Susewind, University Hospital Aachen, Germany.

Gari Walcowitz, University of Cologne, Germany.

Moral behavior often shows fluctuations over time. Acting morally in one situation could either encourage less moral behavior in a subsequent situation, or have the opposite effect. Research on 'moral licensing' has shown that people often use their past moral behavior as a license to act less moral on a subsequent occasion. However, such an inconsistency over time does not always occur. This project examined two potential moderating variables for these dynamics: social recognition and goal perspective. Results from two studies showed that moral licensing is moderated by social recognition. Under conditions with social recognition, past moral behavior decreased moral intentions (study 1) and actual helping behavior (study 2) in line with moral licensing. However, without social recognition, the pattern was reversed towards consistency: Moral behavior increased moral intentions and actual helping behavior. Results from two other studies showed that moral licensing is moderated by goal perspective. When focusing on progress towards goals, past moral behavior decreased prosocial intentions (study 3) and generosity in a dictator game (study 4) in line with moral licensing. However, when focusing on commitment, the pattern was reversed towards consistency over time. In sum, the results demonstrate boundary conditions for the moral licensing effect: When social recognition for moral behavior was not available, and when moral behavior was seen from a commitment perspective, the moral licensing effect reversed towards a pattern of consistency. These findings highlight the relevance of goal regulation theories for understanding the dynamics of moral behavior.

4. Navigating the Social Environment: An Ecological Rationality Perspective on Advice Taking Behavior.

Juliane Eva Kämmer, Max Planck Institute for Human Development, Berlin

Pantelis Pipergias Analytis, Max Planck Institute for Human Development, Berlin

Mehdi Moussaïd, Max Planck Institute for Human Development, Berlin

Hansjörg Neth, Max Planck Institute for Human Development, Berlin and Cognitive and Decision Sciences, University of Göttingen

Many decisions are made in a social context, for example, under the advice of another person. We investigate the environmental circumstances under which two prominent strategies—averaging and choosing—are effective and adaptive, and explore how people employ them. For this, we build on the frameworks of ecological rationality and Soll and Larrick's (2009) PAR model.

We first analytically derive hypotheses concerning the interplay between perceived task difficulty, statistical environmental properties and strategy performance. A first experiment, in which $N = 111$ participants provided spontaneous estimates on a number of general knowledge questions, mainly supports our hypotheses: Tasks of different levels of perceived difficulty exhibit distinctive statistical properties, thus constituting different social environments, which affect the performance of advice taking strategies.

To test whether people in fact adaptively apply different advice taking strategies in different social environments, we conducted a second experiment. Here $N = 90$ participants provided initial estimates on questions that varied in perceived difficulty, received advice in the form of an estimate and confidence rating of another person and then provided a revised estimate. We find no clear preference for any strategy on easy tasks, which is ecologically rational as all strategies make similarly accurate predictions. With increasing difficulty, participants resort more often to averaging and overweighting the self, which again proves reasonable as reliably choosing the better judge was impaired due to the lack of a good cue to expertise.

We discuss the moderating role of a cue to expertise and the importance of considering the social environmental structure when investigating advice taking.

5. Real-life Decision-Making Competence.

Martin Geisler, Department of Psychology, University of Gothenburg

Carl Martin Allwood, Department of Psychology, University of Gothenburg

Many everyday decisions are made in social settings where basic decision-making capabilities, as well as social skills and approach to time, contribute to successful decision-making outcomes. Yet, existing measures of decision-making competence may not sufficiently acknowledge this fact. We studied if the benefits associated with good performance on traditional decision-making tasks, also have predictive validity for other indicators of real-life decision-making outcome than those used in previous research. We also studied if differences in social skills/competence and time-approach could provide additional explanation of the variance in decision-making outcome, beyond that given by performance on more traditional tasks for measuring decision making competence. Two studies were performed; Study 1 targeted students ($n = 118$) and Study 1.2 professionals ($n = 90$). Decision-making competence was measured by the *Decision Making Competence scale*: DMC. Real-life decision-outcome was measured by self-reported *satisfaction with life* and *experienced daily hassles*. We also measured the impact of individual differences in social skills/competence (*self-monitoring ability*, *Machiavellian personality*, and *trait emotional intelligence*) and time-approach (*time-styles* and *procrastination behavior*). Results showed that the capabilities measured by the DMC did not predict variance in outcome in any of the two samples. However, social skills/competence, and especially time-approach, were significant predictors for the used indicators of real-life decision-making outcome. Our results show that attempts to define general decision-making competence can profit from attending to the social nature of decisions, including individual differences in social skills/competence and time-approach.

6. How Expectations and their Violations Affect Decision Making.

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In the present study we aim to broaden our knowledge of the relationship between expectations and social decision making. We did this by examining the role of expectations on people choice when encountering a partner for the first time, as well as, how expectations affect people subsequent choices when re-encountering the same partner again.

To answer the first question we used an Ultimatum Game paradigm. Participants were instructed they were playing with two different groups of players: one that usually makes fair offers (high expectation condition) and one that usually makes unfair offers (low expectation condition). Our results showed that expectations affect choices leading to reject more unfair offers when playing with the high expectation group than with the low one. Therefore, people use specific expectations regarding social interaction as behavioral reference point not only in a between-subjects condition, as previously shown, but also in a within-subjects condition. To answer the second question we used a Dictator Game paradigm, where participants had to allocate money to the same players they had encountered in the Ultimatum Game. Data demonstrated that participants allocated more money to players belonging to the group that usually makes fair offers than to that of unfair offers. This was true for well-remembered players. This finding shows that, in interactive contexts, expectations play an important role also on subsequent choices. Together these two studies extend our knowledge of the role of expectations in social decision making.

Judgement and Intuition (III) Q-301

Chair: Ilan Fischer

1. The decision to shoot or to hold fire: Subjective Expected Relative Similarity and its capacity to predict hostile behaviors.

Ilan Fischer & Maayan Armelin, University of Haifa

Based on the Subjective Expected Relative Similarity (SERS) theory and observation of outbreaks of violent historical events, the present research examines the impact of the interaction between opponent's perceived similarity and the similarity threshold, derived from the payoff structure of

the encounter. Participants took part in computer mediated encounters that involved either shooting or holding fire decisions. Results show that shooting decisions should be expected whenever the probability that describes the similarity with the opponent is lower than the similarity threshold of the game.

2. The Narrow Interpretation Conjecture Meets the Planning Fallacy.

Barbara Summers, University Business School UK

Kruger and Evans (2004) applied concepts from support theory (Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994), a descriptive account of subjective probability judgment, to the planning fallacy showing that unpacking components of a task when describing it increases time estimates. In three studies, we show that another finding from probability judgment research, the narrow interpretation conjecture (Sloman et al., 2004), also applies to time estimates. We find that when atypical components are unpacked time estimates will either increase or decrease based on how time consuming components are perceived to be or how early or late they come in the task sequence. This research provides further support for a similarity in the underlying mechanisms in the two areas and suggests that unpacking is useful in understanding the task duration prediction process.

3. The relationships between intuitive abilities and cognitive styles.

Agata Sobków, University of Social Sciences and Humanities, Faculty in Wrocław

Czesław S. Nosal, University of Social Sciences and Humanities, Faculty in Wrocław

The aim of the present study was to investigate relationships between intuitive abilities (measured by several objective tasks) and cognitive preferences/styles. Participants completed three cognitive tasks associated with intuition (Remote Associates Test, Artificial Grammar Learning and task inspired by Westcott's Test of Intuitive Ability) and two self-report measures (Myers-Briggs Type Indicator and Questionnaire of Cognitive Styles). We observed relatively stable low to moderate positive correlations between different measures of intuition ($\alpha = .60$). As predicted, intuition was positively related to Mind Openness and Verbal Abilities. People who scored higher in intuitive tasks, also described themselves as non-stereotypical and preferred to be distinguishable among others. This result could be associated with greater elasticity and openness of mental structures in highly intuitive individuals. Intuition was also positively related

to Depth of Processing. This may suggest that understanding intuitive processing as fast and shallow may not always be true. The relationship between Thinking-Feeling dimension and intuition is more complex, we observed low negative correlation for measures of abilities, but in declarative intuition this correlation was positive. Our study expands existing body of knowledge on basic mechanisms of intuition and support the idea of measuring individual differences in intuitive abilities (not only preferences in cognitive processing).

4. Using Intuitive Causal Models to Determine the Predictive Value of Cues.

Ana Sofia Morais, Max Planck Institute for Human Development

Henrik Olsson, Max Planck Institute for Human Development

Lael Schooler, Max Planck Institute for Human Development

Björn Meder, Max Planck Institute for Human Development

Intuitive causal theories may be used to determine the predictive value or importance of cues, in the absence of precise knowledge of the true statistical structure of the environment. We test this hypothesis by examining whether people's intuitive causal models about child mortality influence their beliefs about cue importance, above and beyond the cues' true predictive power. The task environment comprised the criterion variable (child mortality) and nine cues (e.g., GDP per capita, HIV prevalence). The objective cue-criterion correlations, calculated from real-world data, were used as a measure of the cues' true predictive power. The experiment involved two tasks. In the causal model task, participants were asked to draw a diagram of how the cues are causally related to each other and to child mortality. In the cue ranking task, participants were asked to indicate in what order they would query the cues, if they had to estimate the child mortality rate of an unknown country. Alternative cue ranks were predicted from each individual's causal model using different formal models that assign each cue a measure of its importance as a function of its position in the causal model. The results showed that people's explicit judgments of cue importance bear little relation with the true cue-criterion associations. In contrast, the cue ranks derived from causal models corresponded more closely to the explicit judgments of cue importance, suggesting that people resort to their intuitive beliefs about causal relations when assessing the predictive value of cues. Computer simulations are underway which examine the relative usefulness of intuitive causal models for guiding search, relative to people's explicit judgments of cue importance and the cues' true predictive power.

5. Productivity increases, suboptimal resource allocations and the time saving bias.

Ola Svenson, Decision Research and Stockholm University

Svenson (2011) found that when productivity was increased for a production line in a factory from an initial low speed (e.g., from 30 to 40 units produced/man-month) the relative gain (e.g., no of less workers needed for the same number of units) was underestimated in comparison with gains from alternatives with increases from high productivity (e.g., from 70 to 110 units per man-month). Judgments, matching judgments and verbal reports were used in 3 studies to explore the roots of this resource saving bias (a kind of time saving bias) and how to ameliorate or eliminate the bias. Verbal reports validated by regression analyses showed that the systematic matching bias could be derived from the use of intuitive difference and a ratio rules. Unfortunately, both rules produce resource saving biases. First judging the saving of an existing productivity increase before estimating the increased speed that would match this saving in another production line improved performance somewhat. A whole preceding session with judgments of not single but successive production increases of the same production line without any comparisons improved later comparative matching judgments significantly. We found that to a significant extent the resource saving bias was a result of poor decision and judgment strategies and not of inabilities to process information without external aids.

6. Why 100 once is worse than 10 times 10: Dread risks versus "continuous" risks.

Nicolai Bodemer, Azzurra Ruggeri, & Mirta Galesic

Nicolai Bodemer^{1,2}, Azzurra Ruggeri¹, Mirta Galesic^{1,2}

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People tend to react more strongly to a dread risk, a rare event that kills many people at once, than to a continuous risk, a relatively frequent event that kills many people over a longer period of time, even when both cause the same number of fatalities. This different reaction to the dread risk is often considered a bias, but we show that it is an ecologically rational strategy. In a series of simulations, we found evidence that dread risks affect the population more severely over time than continuous risks causing the same number of fatalities. This holds particularly true when the risks affect children and young adults who would have produced future offspring

if they had survived longer.

Other topics (II) Q-302

Chair: Matt Twyman

1. Effects of autocorrelation and task order on forecasting and change detection in time series.

Matt Twyman, University College London

Nigel Harvey, University College London

Maarten Speekenbrink, University College London

Changes in time series may be produced by changes in the state of the systems underlying them. When forecasting from such time series, people may be unduly or erroneously influenced by patterns in time series data which may be indicative of such changes (O'Connor, Remus, & Griggs, 1993). Additionally, certain characteristics of time series data such as autocorrelation are known to interfere with the ability to correctly detect changes in time series (Speekenbrink, Harvey, & Twyman, 2012). We present a set of studies in which detection of change in time series and forecasting from those series were both required. The autocorrelation characteristics of the series and task order were manipulated to examine their effects on performance and confidence in performance. In agreement with previous studies, autocorrelation was found to negatively influence change detection performance. However, autocorrelation had the opposite effect on forecasting performance. Furthermore, participants performed better on whichever task they engaged in second. Thus, explicit identification of change helped forecasters take that change into account when making their predictions. These results imply that time series are processed in different ways to accomplish different goals but the processing used for one type of task can benefit the other.

2. How to prevent competitive escalation in the minimal dollar auction paradigm.

Sebastian Hafenbrädl, University of Lausanne

Jan K. Woike, Max Planck Institute for Human Development

Escalation of commitment, the tendency to increase one's investment in a losing course of action even after negative feedback is well known for its adverse consequences. In this paper, we investigate a situation in which escalation of commitment occurs in competitive settings. Based on Shubik's (1971) original auction game, we introduce a 'minimal' dollar auction paradigm, which allows us to study competitive escalation in small anonymous groups in the lab. In three experiments, students and experienced executives bid more than 10 CHF for a prize of 10 CHF. In addition, we test two interventions aimed at preventing competitive escalation: a 'goal setting' intervention, which has been instrumental in reducing classic escalation of commitment, is not effective in the competitive situation, whereas a 'vicarious learning' intervention successfully prevents escalation. The result is consistent with the theory of a 'cold-hot empathy gap' that impedes individuals from correctly anticipating their experience of the competitive situation before entering it.

3. Pricing decisions from experience and their correspondence to pricing decisions from description and choice decisions from experience.

Eyal Ert, The Hebrew University of Jerusalem

Hagai Golan, The Hebrew University of Jerusalem

People often make pricing decisions from experience (e.g., selling one's car). Yet this type of decisions has been surprisingly overlooked. The research on decisions from experience has studied mostly choice decisions, while studies of pricing decisions have focused on decisions from description. Since pricing has been demonstrated to be different than choice, and choices from experience are different from choice decisions from description it is hard to naturally generalize the findings from these two lines of research to the context of pricing from experience. The current study bridge this gap comparing pricing from experience with pricing from description, and with choices from experience. We find that experience attenuates both under-pricing of high-probability lotteries and over-pricing of low-probability lotteries. We also find that pricing from experience attenuates the tendency to underweight rare events which underlie choices decisions from experience. Theoretical and practical implications are discussed.

4. Stopping rules and the perceived value of information cues.

Richard Szántó, Corvinus University of Budapest

Bálint Esse, Corvinus University of Budapest

Search has been a central concept in judgment and decision making research for decades. According to the normative information theory individuals continue information acquisition until the cost of next information bit is higher than its expected marginal return (Stigler, 1961). However, later findings emphasize the role of heuristics in this process. Saad and Russo (1996) identified Core Attribute heuristic that simplifies the amount of calculation required to apply any threshold-based stopping policy. Gigerenzer and Goldstein (1999) propose very simple heuristics such as the Take-the-Best heuristic as stopping rules when making one-reason decision, i.e. based on an inference on only one reason or cue.

Hausmann and Lage (2008) conceptualize the evidence threshold as the "desired level of confidence" of a person. Stopping information seeking depends on a threshold level of confidence, which is closely linked to the value of information the decision maker possesses. In most of the definitions, the *value* of information is derived from the amount of uncertainty eliminated by one piece of information (in our view the decrease in uncertainty equals the rise in confidence). This is often called the *diagnostic value* of information (Jacoby et al, 1994). McCall proposes a different view, where the value of information is given by the difference in utility reachable with and without this information (McCall, 1964). Ahituv and Neumann (1986) distinguish the normative, realistic and subjective value of information. The above views fit in the normative category. The realistic value of information is derived from measuring actual performance achieved under different information sets. Subjective value results from individuals' subjective assessment of various information alternatives, what can depend on the subjective level of uncertainty and their stake in the situation (Karim, 1995). The subjective evaluation of information and the stopping rules of subjects are the central issues in our experiment described below.

In order to measure subjects' perception about cues and to observe stopping strategies we developed the Facility Location Game where subjects have to find an ideal location for a planned facility. Possible locations can be characterized by the quality of infrastructure, the supply of needed raw material sources, labor force and the quality of local taxation systems. Better characteristics the location has the higher chances for successful facility siting occurs. Subjects can "buy" information about the characteristics of the possible locations, and choose one desired location. Cues in this game arrive in a random sequence (players cannot call for cues about given locations themselves); hence the perceived value of the succeeding cue varies a lot. We were looking for stopping strategies of the subjects, and we also observed the perceived value of information during the sequential decision making process.

Our pilot study (N=20) suggests that subjects use various stopping strategies and they don't use

one specific heuristic as earlier papers propose. This can be explained by the fact that earlier studies investigated more simple decision problems (e.g. discriminating between two apartments), yet our game brings a much more complex and more uncertain decision to the table. Regarding the stopping rules we are also exploring cases of information overbuy (compared to a rule, to the expected value or other reference concept).

We suppose that perceived value of information depends on the (1) number of possible locations that the cue covers and also (2) the confirming nature of the information.

It seems apparent that invaluable information in a row can cause weariness of the subjects. It supports the findings of Saad and Russo (1996) who state that subjects in light of an accumulation of acquisition cost and/or poor progress in discriminating between the competing alternatives adapt their behavior and can suddenly stop search. In connection to this statement, we hypothesize that a confirming cue is valued higher when it is provided after a row of low-value cues, than it is when provided right after the cue it confirms.

Subjects are asked to choose a location before any information is given, what is an opportunity to test commitment to this somehow irrelevant value as a type of anchoring. We suppose that the same first cue is valued higher by those, whose guess is confirmed by this cue than by the others.

5. Time-Tradeoff Sequences for Analyzing Time Inconsistency for Health and Money.

Han Bleichrodt, Erasmus University

Yu Gao, Erasmus University

Kirsten Rohde, Erasmus University

Intertemporal choice concerns choices between small-sooner and larger-later outcomes. Several methods have been used to study intertemporal choices in different domains (e.g., money, health, holidays, restaurant meals, etc). This paper focuses on delay discounting and time inconsistency in both health and money, and uses time-tradeoff (TTO) sequences as a general tool to analyze data provided by an experiment. The novelty of this paper is that it uses TTO sequences to analyze time preferences for health, and to compare these with time preferences for money. More specifically, TTO sequences measure the deviation from stationarity. Although discount rates for money and health have already been compared by some studies (Cairns 1992, Chapman and Elstein 1995, Chapman 1996, Hardisty and Weber 2009, etc), we are the first to compare the degree of deviation from stationarity for health with the one for money.

6. Ritalin and trust in decision-making.

Catalina E. Ratala, Erasmus University Rotterdam, The Netherlands

Sean J. Fallon, Radboud University Nijmegen, The Netherlands

Marieke E. van der Schaaf, Radboud University Nijmegen Medical Centre, The Netherlands

Niels ter Huurne, Radboud University Nijmegen, The Netherlands.

Roshan Cools, Radboud University Nijmegen Medical Centre, The Netherlands

Alan G. Sanfey, Radboud University Nijmegen, The Netherlands

Methylphenidate (MPH, i.e. Ritalin®) is a stimulant drug. It acts as an indirect antagonist, by blocking the dopamine (DA) and the norepinephrine transporter. It is largely used in the therapy of Attention Deficit and Hyperactivity Disorder (ADHD), but it is also used recreationally by the student population. It is associated with increased levels of extracellular DA levels (Volkow et al, 2001). The effects of this drug on decision-making abilities of the healthy population are heavily understudied. A recent study by Campbell-Meiklejohn et al. (2012) shows how MPH influences risky decision-making patterns in healthy individuals, by impairing their ability to adjust their responses for higher stakes.

We were interested in investigating risky behaviour in the social domain. We did so by operationalizing risk as the willingness to trust a game partner using a behavioural economics task known as the Trust Game (Zak & Knack, 2001). Trust is a key component of social interactions and several studies demonstrate that people rely on information from previous interactions to assess others' trustworthiness, combined with implicit biases, which are partially encoded in facial features. We investigate if there is any difference in trust decisions, when comparing across three factors: social versus non-social partners, high reciprocating versus low reciprocating partners and partners with high trusting facial features versus partners with low trustworthy facial features. We find that, overall participants invest significantly less under MPH. In addition, this effect seems to be specific for human game partners.

Symposium VI: Improving Judgments and Decisions I – Groups and Crowds Q-401

Chair and Discussant: Emre Soyer

1. Kind and wicked experience.

Robin M. Hogarth, Universitat Pompeu Fabra, Barcelona

Although decision makers want deterministic forecasts, the best forecasters can reasonably do is to provide probability distributions over outcomes. There is thus an important communication problem between forecasters and decision makers. We suggest a solution based on the rationale that people are effective at estimating the frequency of data accurately in kind environments that are characterized by veridical and unbiased feedback. Instead of forecasts, decision makers should be provided with simulation models that allow them to experience the frequencies of potential outcomes. We describe an experimental research program that tested people's ability to assess probabilities accurately based on such simulated experience and found encouraging results with both statistically sophisticated and naïve participants. We conclude that asking decision makers to actively use simulations is potentially a powerful – and simplifying – method to improve the practice of forecasting.

2. Improving group cooperation using neural “mechanism design”

Colin Camerer, California Institute of Technology*

Ian Krajbich, University of Zurich

John Ledyard, Caltech

Antonio Rangel, Caltech

Every social group needs to decide when to provide public goods and how to allocate the costs among its members. Ideally, this decision would maximize the group's net benefits while also ensuring that every individual's benefit is greater than the cost he or she has to pay. Unfortunately, the economic theory of mechanism design has shown that this ideal solution is not feasible when the group leadership does not know the values of the individual group members for the public good. We show that this impossibility result can be overcome in laboratory settings by combining technologies for obtaining neural measures of value

(functional magnetic resonance imaging–based pattern classification) with carefully designed institutions that allocate costs based on both reported and neurally measured values.

3. The Wisdom of Small Crowds.

Albert Mannes, Carnegie Mellon University

Jack B. Soll, Duke University

Richard P. Larrick, Duke University*

The “Wisdom of Crowds” is a well-known phenomenon in which an average of many opinions (the crowd) outperforms many of the more accurate individuals within the crowd (Clemen, 1989; Hogarth, 1978; Surowiecki, 2004). In our past work, we have shown that people are often skeptical of averaging opinions, and prefer to chase the expert instead, by adopting the opinion of a single perceived expert (Authors, 2009). In doing so people often miss out on the benefits of aggregation. Although the signature finding is that averaging beats chasing, the latter can perform well when there are large differences in the estimation skills of the crowd members. To be effective, a decision maker who chases the expert must identify one of the better judges within this high-dispersion context. In the present research we examine a middle strategy of using available, limited cues to identify the top five judges and average their opinion. This strategy captures the best of the pure strategies of averaging everyone and chasing a single expert: It detects expertise if it exists, and it cancels errors through averaging. To compare strategies, we analyzed 90 datasets from the domains of economic forecasting and psychology experiments and constructed additional simulations. We find that the small crowd is a robust strategy, in that it performs well across a wide range of environments that vary in the dispersion of expertise and the correlation of error across judges. In contrast, neither of the competitor strategies—whole crowd and chase the expert—is robust. Our results suggest the following prescription: Rank experts based on their recent performance, and then average the opinions of the top five. This strategy is both effective and psychologically appealing.

4. The benefits of the wisdom of crowds in hedonic prediction.

Johannes Müller-Trede, Universitat Pompeu Fabra*

Shoham Choshen-Hillel, Hebrew University of Jerusalem

Meir Barneron, Hebrew University of Jerusalem

Ilan Yaniv, Hebrew University of Jerusalem

Our research investigates whether the accuracy gains from averaging procedures often found in judgments of objective facts also exist in the realm of subjective hedonic predictions. We suggest that under certain conditions individuals can better predict their hedonic experiences by taking into account other people's predictions of *their* hedonic experiences. Such an improvement is not a forgone conclusion since hedonic experiences are subjective and therefore tend to vary from one person to another. We present a formal model which identifies a set of conditions under which others' self-forecasts could inform one's own hedonic forecasts, and report a study which tests this model. In our study, participants viewed 10-second excerpts taken from a number of (short) video films and were then asked to predict how much they would enjoy watching each of the full-length videos from which the excerpts had been taken. A week later, they watched the full-length videos and rated how much they actually enjoyed each of them. Our analyses revealed that participants' predictions of their actual enjoyment could improve by using the *wisdom of crowds* (averaging their predictions with those of other participants). Two additional predictions of the model were tested, which differ from the usual *wisdom of crowds* in objective judgment tasks. First, the model implies that individuals have privileged knowledge and should therefore weight their own predictions more heavily than those of other people. Second, it implies that participants could improve accuracy by relying on the predictions of similar rather than dissimilar others. We find strong support for the first- and weaker support for the second prediction. We relate our findings to the literature on the *wisdom of crowds*.

Consumer JDM (II) Q-402

Chair: Jamel Khenfer

1. Out of control: impact of goal structure on personal control and implications for consumer judgments.

Jamel Khenfer, Aix-Marseille University (CERGAM-IAE Aix)

Perceived control is an important aspect of psychological functioning (Skinner 1996). It allows people to realize actions under the assumption that the produced outcomes will be the desired ones and the undesired ones will be avoided. But how can one expect to achieve the goal being pursued if one feels s/he has no control over it? This research is part of a larger project that argues that mental representation of goal structure might affect consumer judgments through lack of personal control. Such an heuristic implies that unstructured goals increase perception of randomness and chaos which the consumer seeks to compensate by seeking order in his/her environment. Because perceived order in one's environment primarily derives from personal control, when feelings of personal control are low, people should seek for structure and order their environment. However, when feelings of personal control are high (e.g., high structure of the goal being pursued), they should *embrace the chaos*, meaning that they should be more willing to accept unlikely categories of means to attain their goal. This research is a necessary step before further investigations on the impact of perceived control on consumer judgment could be pursued.

2. The Effect of 'Giving it all up' on Valuation: A New Look at the Endowment Effect.

Amos Schurr, Ben Gurion University of the Negev

Ilana Ritov, Hebrew University

We show that the endowment-effect – people's tendency to demand more money for relinquishing goods they own than they are willing to pay to buy the same goods – fails to obtain when sellers are not fully depleted of their endowment. This finding is incompatible with Prospect Theory's account of the effect as stemming primarily from aversion to loss relative to the DM's current state. We suggest a new account of the endowment effect as stemming from an aversion to 'giving it all up' rather than just an aversion to incurring any loss relative to the Status-Quo.

3. The price of in situ information: value judgements across situations and elicitation methods.

Bernadette Kamleitner, Vienna University of Economics and Business

Hamed Haddadi, Queen Mary University of London

Stephan Dickert, Vienna University of Economics and Business

Numerous smartphone applications and social networking sites harvest and catalogue users' personal information, enabling brokers such as Google and Facebook to provide a platform for advertisers to use this information for targeted advertising. Despite the fact that the users of these services are at the heart of this ecosystem, there has been little effort in understanding individuals' perception of the value of their personal data in different contexts and situations. In this work, we present the results of our large-scale, contextual, longitudinal study that used smartphones to collect data on user activities, location, and companionship, as well as the amount of money that this information is worth to them. Our results indicate that the value of information is sensitive to situational cues and valuation biases. But that these biases are no stronger than for other types of tradable goods and that they do only appear in some situations. Private situational information about social situations is less prone to anchoring and endowment effects than private information about other types of situation. This study represents a first step towards providing insights into the usefulness of a marketplace for information, where users, or their agents, can freely decide to auction off various pieces of their information within established contexts.

4. Prominence versus Dominance.

Ioannis Evangelidis, Rotterdam School of Management, Erasmus University Rotterdam

Jonathan Levav, Stanford Graduate School of Business, Stanford University

In this research we argue that choice sets can influence the extent to which consumers weight an attribute because they create a decision context that can influence choice by triggering different decision strategies. In particular, we discuss one characteristic of the decision context that exerts a strong influence on choice: The presence or absence of dominance relationships between any of the options in the choice set. We focus on decisions between two target alternatives that present a trade-off between two attributes, one of which is more prominent than the other. Normatively consumers should assign greater weight to the more prominent

attribute relative to its less prominent counterpart. This implies that they should be more likely to choose the alternative that rates higher on the most prominent attribute than the alternative that scores higher on the least important attribute, *ceteris paribus*. However, building on theory on decision strategies (e.g. Tversky, Sattath, and Slovic, 1988) and stickiness (e.g. Luchins, 1942) we hypothesize that when the two target options are dominated by and/or dominate other ("decoy") options in the choice set, consumers are more likely to evaluate the options in the set based on dominance relationships rather than attribute prominence. Six experiments provide empirical support to our theory. When a symmetrically dominating and/or a symmetrically dominated decoy option are inserted in a choice set, preference for an option scoring high on a prominent attribute decreases. Further, attribute importance judgments remain unaffected by the inclusion of decoys, suggesting that attribute prominence as an input to preferences varies depending upon the choice set.

5. On the Gap Between Preference and performance.

Idan Zelikovich, Kinneret Teodorescu, Yoram Bachrach, Ido Erev

Technion – Israel Institute of Technology, Haifa, Israel

In one of his last interviews Steve Jobs, the late CEO of Apple, was asked "What market research did you do that led to the iPad?" Jobs gave a short answer: "None. It's not the customer's job to know what they want". This research tries to clarify the conditions under which jobs' assertion is likely to hold. Specifically, we focus on situations in which people prefer tools that impair their performance. Our study begins with a focus on a choice between two tools that will be used to solve various tasks. Both have "hard to learn, but potentially best" mode, but one also has "easy to learn, but less efficient" mode. The optimal strategy is to choose the 2-mode tool and condition the choice between modes on the expected cost and benefit from mastering the hard mode. When the task is exotic (i.e., a rare task), the easy mode should be used because the benefit from learning is low. Results show that people's preference implies an optimal choice (65% chose the 2-mode tool); however, they tend to overuse the easy mode and perform significantly better with the 1-mode tool. We examine 3 contributors to this tendency: (1) insufficient sensitivity to delayed outcomes that implies a tendency to pursue immediate outcomes, (2) tendency to give up too early that implies learned helplessness and (3) overgeneralization that can lead to insufficient use of the hard mode to address common tasks and too much use of this mode to address exotic tasks. Our analysis reveals that the tendency to give up too early is a sole sufficient condition for the results. Most subjects tried the "hard but

efficient mode" several times but stopped exploring too early. In addition, results suggest that that insufficient sensitivity to delayed outcomes and overgeneralization increase inefficiency.

4.45pm–6.45pm

Uncertainty and Probability (IV) Q-101

Chair: Yvette van Osch

1. Lower precise monetary estimates are sometimes more attractive than higher round estimates.

Yvette van Osch, Tilburg University

Job van Wolferen, Tilburg University

People prefer the use of round numbers (Lynn, Flynn, & Helion, 2013). However, these round numbers, compared to more precise numbers, convey imprecision. For instance, Mason and colleagues (2013) revealed that precise opening offers in negotiations yield more favorable counteroffers, because these offers reflect knowledge. Zhang and Schwarz (2012) found that fine-grained time estimates (7days vs.1 week) were perceived as more accurate. We are interested in changes in preferences when offered round price estimates (e.g., \$150) versus more precise price estimates (\$149). In line with previous literature, we expected round numbers to convey more uncertainty. Extending previous literature, we think this may lead people to prefer lower more precise monetary estimates over higher, but less precise, estimates. In Study 1, participants (N=300) indicated what they thought would be the maximum and minimum price for seven items that were either round or more precise (e.g., \$9, 10, or 11). In contrast to the work by Zhang & Schwarz, Study 1 revealed that only the lower limit (not the upper limit) of the estimated price range was shorter for estimations with round prices. In addition, the range of the round price (e.g., 10) was almost always larger compared to the range of the lower precise price (\$9). In Study 2 (N=228), a hotel room with prices starting from \$51 was seen as marginally more attractive than one with prices starting from \$50. In a third study (N=265), people were willing to pay more for a 50% chance to win approximately \$149 than for the same chance to win approximately \$150. In sum, round versus precise monetary estimates convey more uncertainty. In some cases the reduced uncertainty of the estimate might increase preferences for a particular product or outcome.

2. Making Case-Based Decision Theory Directly Observable.

Han Bleichrodt, Erasmus School of Economics, Erasmus University

Martin Filko, Institute for Financial Policy at Ministry of Finance of the Slovak Republic,

Amit Kothiyal, Max Planck Institute for Human Development, Lentzeallee

Peter P. Wakker, Erasmus School of Economics, Erasmus University

Gilboa & Schmeidler's case-based decision theory (CBDT) is an alternative to Savage's state-space model for uncertainty. In CBDT, preferences are determined by similarities with cases in memory. This paper introduces a nonparametric method to measure CBDT, requiring no commitment to parametric families and relating directly to decisions. An experiment on real estate investments demonstrates the feasibility of our method. Our implementation of real incentives avoids not only the income effect, but also interactions between different memories. We confirm CBDT's predictions with one exception: we found one violation of separability of cases in memory. CBDT gives plausible predictions and new insights into (real estate investment) decisions.

3. My Confidence in Your Judgement is Better Than Yours –and Vice Versa!: Swapping Judgements Improves Calibration.

Aidan Lyon, University of Maryland

Experts are often called upon to make quantitative estimates. Eliciting interval judgements with attached confidence can be a useful way to measure expert uncertainty. However, overconfidence can be high for such judgements, especially when the interval bounds are self-generated, rather than predetermined. When uncertainty is high, predetermining reasonable bounds may not be practical. Interval judgement swapping provides a practical solution to this problem. Participants were asked for interval judgements and confidences in those judgements for a series of quantity estimation questions. The original confidence ratings were then removed, and participants swapped judgements and assigned confidence levels to each others' intervals. Four replications of this experiment were conducted, resulting in a total of 111 participants. A random-effects meta-analysis showed that judgement swapping resulted in a 5.27% percentage point improvement in calibration (95% CI = [2.61, 7.94]), and a 6.88% percentage point reduction in overconfidence (95% CI = [1.52, 12.24]).

4. Ownership status and the representation of assets of uncertain value: The Balloon Endowment Risk Task (BERT).

Lukasz Walasek, University of Essex, United Kingdom

Rebecca J. Wright, University of Essex, United Kingdom

Tim Rakow, University of Essex, United Kingdom

Owners tend to overvalue possessions relative to non-owners: a phenomenon known as the endowment effect. In two experiments, using markets for goods of uncertain value, we investigated whether this can be attributed to misperceiving an investment's profitability. We also tested an explanation offered by the reference-dependent subjective expected utility (Loomes, Orr & Sugden, 2009), according to which endowment effects can arise from uncertainty about one's own preferences. To test our hypotheses we constructed a Balloon Endowment Risk Task (BERT), in which participants can sell or buy their right to take part in the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). Once purchased/retained, a balloon is pumped to accrue money, which is lost if the balloon bursts. Participants first learn about the risky investment (balloon) by observing others playing the BART before they enter the market. In Experiment 1 we replicated the endowment effect, despite this, the owners and non-owners were willing to pump the same number of times and subsequently did so when given the opportunity. In Experiment 2, the level of uncertainty about the balloon's profitability was manipulated by modifying the number of bursts that players viewed in the learning stage of the task. The results showed that when the average burst point is easier to estimate (reducing value uncertainty), the endowment effect diminishes. When uncertainty was high, the WTA-WTP disparity increased, though estimates of the average burst point did not differ between owners and non-owners. We conclude that the endowment effect with risky assets is not caused by different representations of the good by owners and non-owners; rather, that higher levels of uncertainty lead to larger WTA-WTP disparities.

5. Rethinking the role of intuition in probability judgements: Thinking mode dispositions and time pressure.

Jennifer Faure-Bloom, Kingston University

Gaëlle Villejoubert, Kingston University

Frédéric Vallée-Tourangeau, Kingston University

People frequently commit the conjunction fallacy when making conjunction probability judgements. This error of judgement has traditionally been ascribed to the representativeness heuristic because, under its influence, people neglect logical considerations to estimate those probabilities. More recently; however, it has been proposed that people have an implicit knowledge of logical principles (De Neys, 2012; Author, 2009). This study explored the idea that individuals who engage more naturally in effortful thinking are also more prone to produce illogical probability judgements if they have time to deliberate, positing that it is in fact the slower, more deliberative, form of thinking that is more vulnerable to non-logical heuristics. A novel methodology was used to study the cognitive underpinnings of people's intuitions concerning the conjunction rule of probabilities. A 2 (time) x 2 (representativeness) x 2 (logicality) x 4 (block) mixed design was used, with repeated measures on the latter three factors. The Rational-Experiential Inventory scale provided an assessment of the impact of individuals' need for cognition on the relative weight of heuristic and logical considerations in probability judgments. Results revealed that, contrary to common belief, assessments of representativeness are not automatic and rapid but are in fact most influential when participants are not pressured by time to provide a judgment. Participants were also found to be sensitive to violations of logical probability laws, and to spend longer solving problems when representativeness conflicted with logic. However, we failed to find a significant effect of individual differences on the Rational-Experiential Inventory on their tendency to produce heuristic or logical answers.

Choice (IV) Q-102

Chair: Martin Schonger

1. Social Preferences or Sacred Values? Theory and Evidence of Deontological Motivations.

Martin Schonger, Center for Law and Economics, ETH Zurich

Daniel Li Chen, Center for Law and Economics, ETH Zurich

Recent advances in economic theory, largely motivated by experimental findings, have led to the adoption of models of human behavior where a decision-maker not only takes into consideration her own payoff but also others' payoffs and any potential consequences of these payoffs. Investigations of deontological motivations, where a decision-maker makes her choice not only based on the consequences of a decision but also the decision per se have been rare.

We propose an experimental method that can detect the presence of deontological motivations by varying the probability of the decision-maker's decision being consequential. It uses two states of the world, one where the decision has consequences, and one where it has none. A decision-maker whose preferences satisfy first-order stochastic dominance will choose the decision that leads to the best consequences regardless of the probability of the consequential state. We find experimental evidence for the existence of deontological motivations. The direction of change indicates how deontological motivations are incorporated into preferences.

2. The wavy impact of experience.

Presenting author: Ido Erev, Technion and IDC

Co-authors: Kinneret Teodorescu, Technion

Analysis of the effect of feedback on repeated decisions reveals "wavy impact curves." For example, consider a choice between the status quo (0 with certainty), and a risky gamble (R) that yields "+10 with $p = .1$; and -1 otherwise." The choice rates in a 100-trials study of this problem reflects the following pattern: The reaction to a gain is initially positive (+10 increases the tendency to select R in the very next trial), then negative (+10 at trial t reduces the tendency to select R in trial $t + 2$ to trial $t + 10$), then positive again (+10 at t increases the R-rate at trial $t+11$ to trial $t+35$), and then the effect diminishes.

The current paper examines the robustness and the implications of this wavy pattern. The results suggest that the wavy pattern emerges in problems that involve rare and extreme outcomes. Comparison of alternative models clarifies the value of a model that assumes two response modes: Contingent average and last. Under Mode Contingent average, the decision maker selects the option that led to the best payoff under similar situations in the past. Similarity is defined by the sequence of the last k outcome (k is a free parameter, the best estimate is 5). Under Mode Last, the decision maker selects the option that yields the best payoff in the last trial. The probability of selecting this mode is a free parameter (the best estimate is 0.15). The results reveal that this model captures the wavy impact pattern as well as the other robust properties of decisions from experience: it implies reliance on small samples, underweighting of rare events, the payoff variability effect, and surprise-trigger-change. The predictive value of this and related models are compared in a new study that focuses on 10 randomly selected problems.

3. Using personalized recommendations to understand the role of diversity on choice overload.

Martijn C. Willemsen, Eindhoven University of Technology (presenting)

Mark P. Graus, Eindhoven University of Technology

Bart P. Knijnenburg, University of California, Irvine

People like to choose from large item sets, because such sets are more likely to contain several items they really like. However, large sets cause a phenomenon called "choice overload": they are more difficult to choose from. Previous research suggests choice overload occurs because large sets contain more similar items, increasing cognitive effort and potential regret without providing much additional benefit. One remedy would be diversification. However, most studies provide all participants with the same non-personalized assortments making it hard to control similarity and item attractiveness, which might be one reason why evidence for the choice overload phenomenon is mixed (Scheibehenne et al., 2010).

In this paper, we control personalized item sets with a recommender system. Our recommender algorithm describes items and participants on a set of latent features that represent preference dimensions. Using diversification on these latent features we are able to decrease the similarity of a set of items, while keeping the overall attractiveness of the item set constant. This allows us to study if diversifying a set of items can indeed reduce the choice overload of a set of items.

The first study tests the effectiveness of the diversification manipulation and shows that diversifying the recommendations increases the attractiveness of the item set, while at the same time reducing the perceived difficulty of choosing from the set. The second study subsequently shows that diversification can reduce choice difficulty without decreasing attractiveness, increasing participants' satisfaction with the chosen option, especially when they are choosing from small, diverse item sets. Therefore, diversification of smaller sets might be the key to prevent choice overload.

4. Virtues and Vices in Monetary Tradeoffs: Evidence of Comparative Mental Accounting in Intertemporal Choice.

Marc Scholten, ISPA University Institute, Portugal

Most psychological research on intertemporal choice has focused on choices between single

dated outcomes and choices involving sequences of single-valence outcomes, both in the monetary domain and in nonmonetary ones. Research on choices involving mixed prospects, or schedules of costs and benefits over time, is relatively rare, and virtually nonexistent in the monetary domain. We provide an integrative analysis of monetary tradeoffs involving single dated outcomes, sequences of single-valence outcomes, virtues (schedules of investment followed by benefits), and vices (schedules of benefits followed by debt). Results include debt aversion (aversion to delayed payments), aversion to vices (the pain of a delayed payment is greater when it is the cost of a sooner benefit than when it is an uncompensated loss), attraction to virtues (the pleasure of a delayed receipt is greater when it is the benefit of a sooner cost than when it is an uncompensated gain), and core anomalies in preferences involving sequences, which are incompatible with all models of intertemporal choice. To account for the results, we propose an extension of the double-entry mental accounting model of investment and debt (Prelec & Loewenstein, 1998). In the basic model, sooner costs are buffered by later benefits, yielding attraction to virtues, and sooner benefits are attenuated by later costs, yielding aversion to vices. In the extended model, people first make direct comparisons between the options: By comparing outcomes available at consecutive delays, they treat the options as streams of comparative gains and losses, and therefore, in many instances, as relative virtues and vices. Attraction to relative virtues and aversion to relative vices then accounts for many puzzling phenomena.

5. Zeroing in on the "hidden zero" effect.

Daniel Read, Chris Olivola: Behavioural Science Group, Warwick Business School

Dave Hardisty: Sauder School of Business, University of British Columbia

Magen et al. showed that patience in choices between smaller-sooner (SS) and larger-later (LL) options is increased if the "zeroes" are included in the option description – the Explicit-zero frame. In five experiments we decomposed this frame into its components and pinpointed its locus as the delayed-zero. Making only the Delayed-zero explicit increased patience to the same degree as making both zeros explicit, whereas making the Today-zero explicit had no effect. We suggest that one reason is that when choosing between rewards available now versus later, people are naturally aware that waiting for the later reward means getting less now, but they don't similarly appreciate that getting something now will mean getting less later. Theories of intertemporal choice (for desirable outcomes) have mainly focused on asymmetries in the evaluation of immediate versus delayed *benefits*. Similarly, intertemporal choices may also be

driven by corresponding asymmetries in the evaluation of immediate versus delayed *opportunity costs*.

Social Aspects in JDM (IV) Q-103

Chair: Uriel Haran

1. Know who you're up against: Counterpart identifiability enhances competitive behavior.

Uriel Haran, Ben-Gurion University of the Negev, Israel

Ilana Ritov, Hebrew University of Jerusalem, Israel

Research on competition highlights the role of certain attributes of competitors and their relationships as determinants of competition intensity. In this paper, we show that similar effects on competition can occur even when competitors are anonymous to each other, but are merely identifiable, that is, their identities have been determined but not revealed. While previous research found that identifiable targets elicit enhanced pro-social behavior, relative to non-specified targets, we suggest that identifiability can also influence competitive behaviors as well. Data from two experiments show that providing arbitrary information about one's competition enhances one's goal-driven behavior: in a competitive perceptual task, participants competing against identifiable counterparts exerted more effort and performed better than participants whose counterparts were undetermined; in a dyadic auction, participants offered more money to outbid an identifiable counterpart for an auctioned product than when paired with an unspecified counterpart. Additionally, competitor identifiability seems to strengthen the relationship between competitiveness and the motivation not to lose, relative to its relationship with the desire to win.

2. The Hidden Cost of Insurance: When Decreasing Risk Decreases Cooperation.

Philippe van de Calseyde, Tilburg University, Netherlands

Gideon Keren, Tilburg University, Netherlands

Marcel Zeelenberg, Tilburg University, Netherlands

Trust implies risk and a common solution to mitigate problems of risk is to buy insurance. In

three experiments, employing "the trust game", we find that buying insurance may have a hidden cost: Trustees are more likely to act opportunistically and betray trust when trustors choose to be insured against the risk of betrayal. Supposedly, by obtaining an insurance against the risk of betrayal a trustor implicitly signals doubts about the trustee's intentions, encouraging the trustees to act opportunistically rather than cooperatively. However, when trustors were insured by a random device (i.e., not by own choice), trustees did not become less cooperative. These results shed new light on the potential weakness of financial safeguards that are intended to minimize the risky nature of trust taking: The presumed remedy against the risk of betrayal may, under certain circumstances, increase the probability of betrayal.

3. Standing United or Falling Divided? High Stakes Bargaining in a TV Game Show.

Dennie van Dolder, Erasmus University Rotterdam

Martijn J. van den Assem, Erasmus University Rotterdam

Colin F. Camerer, California Institute of Technology

Richard H. Thaler, University of Chicago

We examine high-stakes three-person bargaining in a game show where contestants bargain over a jackpot that is split into three unequal shares and ranges from about \$10,000 to \$185,000. In line with equity theory, we find that individual behavior and outcomes strongly depend on contestants' contributions to the jackpot. Those who contributed more to the jackpot claim higher shares, are less likely to make concessions, and take home larger amounts. When the stakes are higher, contestants are more likely to announce a hardball strategy of not backing down from their initial claim. The size of the jackpot also influences actual behavior, but not in linear fashion: the likelihood of concessions is U-shaped, with contestants being most likely to make concessions at the highest and lowest stake levels, and less so in between. As a result, teams are more likely to reach consensus if the jackpot is closer to the extremes. Announcing hardball positively affects the contestants' payoff relative to others, but does not have a strong effect on their own absolute payoffs. There is no evidence of a first-mover advantage and little evidence that demographic characteristics matter.

4. Taking pleasure in pain: Why good people enjoy punishing.

Katrina Marie Fincher & Philip E. Tetlock, University of Pennsylvania

Theories of punishment need to account for the cognitive processes that allow flexible and fluid movement between sympathy and wrath. Kelman (1976) argued that dehumanization allows conditions under which the normal moral restraints on violence are weakened and other people no longer evoke compassion. The present work explores dehumanization as a fundamental mechanism that allows individuals to derive positive utility from punishment. The research combines diverse methodology by integrating work from perception with work from decision making to understand the effect of dehumanization on punitiveness. Facial recognition relies upon configural processing, which differs from analytic processing, which is used in object recognition. Using the face inversion effect, results from three studies found that configural processing of perpetrators was reduced and individuals engaged in analytic processing; the faces of perpetrators were processed like objects rather than human faces. Results from study 1 indicate the inversion effect is significantly reduced in bad actors and enhanced in good actors, and that conservatives show significantly greater dehumanization of actors with negative moral histories than liberals and less dehumanization of actors with positive moral histories. Results from study 2 indicate that the dehumanization of perpetrators predicts enjoyment and consumption of corporal punishment. Results from study 3 indicate that unattributed retributive desires increase the dehumanization of bad actors.

Dehumanization allows individuals to derive positive utility from punishment and increases the effect of irrelevant emotions. Dehumanization may thus increase punishment and reduce the importance of deterrence-based factors by mitigating the cost of punishment.

5. Giving and justifying self-interested advice.

Ilan Yaniv, Shoham Choshen-Hillel, Meir Barneron, & Chen Pundak, Hebrew University of Jerusalem

Decision makers often seek the advice and recommendations of others. Ideally, advisors should simulate the recipient's utility for each of several options and then recommend the one they believe maximizes the utility from the recipient's perspective. Advisors though often have a stake in the options (e.g., a doctor who receives a research grant from a pharmaceutical company might be motivated to prescribe certain related drugs). Our research examines the

psychological processes involved in cases where advisors' interests conflict with those of the recipients. We investigate how advisors evaluate alternatives for the recipients as a function of their own and their recipients' interests. We hypothesize that advisors take advantage of the fact that choice options often vary on several dimensions. Advisors thus latch on to those aspects of the options that favor the option that coincides with their self-interest. Presumably, this allows them to justify their biased advice and maintain their self-image as honest brokers of information. In our studies, participants played many rounds of a computerized game. In each round, they had to choose which of two lotteries to play. The lotteries differed in terms of the size of the prize and the probability of winning it. Participants were then asked to recommend to another participant which of two lotteries to play. We manipulated the advisors' stake in the options and measured their recommendations and rankings of the importance of the two aspects of the lotteries (size vs probability). As hypothesized, recommenders offered self-interested advice and, more importantly, they also had self-serving views of the interests of their recipients. The findings are discussed in relation to advice giving, ethicality and elastic justification.

6. Why often-heard things tend to be true: The ecological rationality of the truth effect.

Stefan Michael Herzog, Center for Adaptive Rationality. Max Planck Institute for Human Development, Berlin, Germany

Christian Unkelbach, University of Cologne, Germany

Ralph Hertwig, Center for Adaptive Rationality, Max Planck Institute for Human Development, Berlin, Germany

The more often a statement is repeated, the more people tend to believe it. Repetition leads to this "truth effect" for two complementary reasons, which both build on a valid link between frequency and truth. First, people may remember having heard a repeated statement before and conclude that it is therefore likely true. Second, because repeating a statement increases its processing fluency and because people have learned that fluently processed statements tend to be true, people may infer truth from fluency. Although ample experimental research showed that truth judgments can be biased by normatively irrelevant factors, little is known about when the frequency-truth link is warranted. We provide (a) two a priori arguments for why frequency should generally indicate truth (cooperative communicators and many possible wrong statements for one true statement); (b) a Bayesian argument showing that using fluency as a cue for truth leads to above chance accuracy (whenever one is a priori more likely to experience

true than false statements in the world); and (c) empirical evidence that true statements are processed more fluently than false ones. We further present an ecological analysis of an internet text corpus as a case study investigating the frequency–truth link in the domain of spelling: Among the most commonly misspelled words on the English Wikipedia, the correct spelling appears more frequently on the internet in 98% of cases. Based on our a priori arguments, published experimental findings and ecological analyses (grounded in cognitive models of memory and learning), we discuss why frequency generally indicates truth and derive boundary conditions for this frequency–truth link.

Symposium VII: Advances in the use of directed attention to understand and predict human behavior Q-301

Chair: Nathaniel Ashby & Susann Fiedler

Discussant: Andreas Glöckner

1. The leaky mind: The role of attentional allocation, primacy, and “forgetting” in choice.

Nathaniel J. S. Ashby, Andreas Glöckner, & Marc Jekel, Max Planck Institute for Research on Collective Goods

A growing body of work indicates that preferences are constructed through a dynamic process which is heavily reliant on attentional allocation. In two studies employing eye tracking methodologies we investigated the role of attention on decisions involving choices between varying numbers of options. In Study 1 participants chose from either two, three, or four possible donation recipients. The data supports the supposition that attention plays a pivotal role in the decision process, with the inclusion of attention providing greater predictive accuracy than decision models based solely on initial preference ratings. Furthermore, we find that a model placing increased weight on previous information, while simultaneously “leaking” previously accumulated information, provides the best fit for the data suggesting that memory processes likely play a role as well. In Study 2 we increased the number of options to eight and included choices between candy bars. We find that the model developed in Study 1 provides a good fit for both kinds of choices, even when eight options are available. Together, these results provide further evidence of attention's role in the construction of preference and hints that working memory plays an important role as well.

2. Social Value Orientation and information Search in Social Dilemmas: An Eye-Tracking Analysis.

Susann Fiedler, Max Planck Institute for Research on Collective Goods

Andreas Glöckner, Max Planck Institute for Research on Collective Goods

Andreas Nicklisch, University of Hamburg

Stephan Dickert, Max Planck Institute for Research on Collective Goods

Previous work has demonstrated that Social Value Orientation (SVO) is related to cooperative behavior in social dilemmas. However, little is known concerning the underlying processes. In two eye-tracking studies investigating decisions in money allocation tasks (Experiment 1) and Public Good Dilemmas (Experiment 2), we show that differences in SVO are accompanied by consistent differences in information search. Decision time, number of fixations, the proportion of inspected information, the degree of attention towards the others' payoffs, and the number of transitions from and towards others' payoffs gradually increase with absolute SVO deviation from a pure selfish orientation. Overall these effects seem to be similar for individuals caring positively (i.e., cooperative) or negatively (i.e., competitive) about others. The fact that changes are gradual instead of abrupt indicates that differences in SVO seem to be related to gradual changes in weights given to outcomes for self and others

3. Accounting for Attention in Temporal Decision Making.

Ana M. Franco-Watkins, Auburn University

Many decisions involve making choices between immediate and future prospects. The general tendency to discount future gains in lieu of smaller immediate gains is known as temporal discounting. Although the basic temporal decision making paradigm has been associated with real-world problematic behaviors, it does not adequately model real-world situations where often there are immediate and delayed costs (as well as rewards); and the rewards and costs of future outcomes are probabilistic rather than certain. The current work builds upon and extends the standard paradigm, to include the parameters involved in decision making (e.g., time, uncertainty, gains, and losses) and used eye-tracking methodology to examine attentional processing to different elements of choice options during decision making. Additionally, we determined whether individual differences in propensity to engage in risk and impulsive behavior and the tradeoffs between different decision parameters. We present how accounting

for some of these complexities allows for a better theoretical understanding of the mechanisms and processes involved in temporal decision making.

4. Accounting for Attention in Temporal Decision Making.

Joseph G. Johnson, Miami University

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5. The Role of Visual Attention in Decision Making.

Jacob Lund Orquin & Simone Müller Loose, Aarhus Universitet

Most contemporary theories of judgment and decision making make certain assumptions about the role of visual attention in decision making. Although the theories might differ substantially their assumptions about attention generally do not. One common assumption shared by, for instance, rational and bounded rationality models is that the role of attention is to acquire information in a manner determined by the decision strategy. Another assumption shared by evidence accumulation models is that attention is a stochastic information sampling process. In order to examine the role of attention in decision making and test the assumptions of contemporary decision theory we reviewed empirical studies on eye movements in decision making. The findings suggest that although the decision theories make several correct predictions their basic assumptions about attention are in conflict with what is known from

vision and attention research. We find that visual attention is neither a random sampling process nor is it an appendix to a decision strategy. Visual attention in decision making applies its own *modus operandi* and in doing so play an active role in constructing decisions.

Symposium VIII: Network-Bounded Rationality: How Social Structure Influences Sampling, Judgment and Learning Q-302

Chair: Chengwei Liu & Jerker Denrell

Discussant: Ralph Hertwig

1. On Rational Inferences in Nested Structures.

Presenting Author

Florian Kutzner, Warwick Business School, University of Warwick

Co-authors

Klaus Fiedler, Universität Heidelberg

Tobias Vogel, Universität Mannheim

From a social psychological perspective, a prominent characteristic of social networks is their nested structure. Scientific cliques are nested in communities, communities in societies, societies in disciplines etc. This nested structure can be used to aggregate and simplify information. However, conclusions drawn at different levels of aggregation can diverge or even contradict each other. As one example, measures of correlation are quite independent across different levels of aggregation. In the present paper, we address how correlations diverging at different levels of aggregation are integrated and whether this is done in a rational way.

We first demonstrate how correlations at an aggregate level bias correlation judgments at a lower level (Exp. 1), how, conversely, correlations at an individual level bias judgments at an aggregate level (Exp. 2) and how forced exposure to diverging correlations does lead to a compromise in judgments rather than a differentiation by aggregation level (Exp. 3). We then introduce the concept of pseudocontingencies (PCs) to illustrate a simple way of making inferences within a nested structure. In essence, PCs are an inference strategy that uses the skew in two variables' base rates to infer a correlation between them, predicting frequent levels of variables and infrequent levels of variables to co-occur.

Finally, we illustrate when PCs afford adaptive inferences. We specify the conditions under

which a) skewed variable base rates shift the posterior of the expected correlations and b) existing correlations tend to produce skewed base rates in small empirical samples.

2. Partial Diffusion Is an Unreliable Indicator of Quality When the Matthew Effect Is Bounded by Cliques.

Presenting Author

Chengwei Liu, Warwick Business School, University of Warwick

Co-authors

Nick Chater, Warwick Business School, University of Warwick

Jerker Denrell, Warwick Business School, University of Warwick

Thomas House, Warwick Mathematics Institute, University of Warwick

The relation between observed performance and underlying quality is a central concern within social sciences. Prior research shows that social processes, including the Matthew Effect, can decouple performance and quality to such extent that top performers may not have the highest expected quality. Here we show that the same mechanisms can be moderated by network structures, leading to more uncertainty about intermediately high network performance. This implies a dip in the middle range in the relation between performance and expected quality. We use a twofold approach to demonstrate our argument: (1) empirically, a survey asking participants to vote the best article published in Management; (2) theoretically, a simulation model formalizing the intuition of our survey finding. Our findings imply that when the social processes can strongly influence diffusion processes but their effects are bounded, then partial adoption can be an especially unreliable indication of quality. Objects lacking in quality can then quickly diffuse through part of the network if social conditions are favorable. But only objects with the highest quality can pass all the hurdles in contagion processes and gain widespread adoption. Widespread adoption is thus a reliable indicator of quality. Partial adoption, however, is an unreliable indicator of quality because both objects of low and high quality can reach this level. A lower level of adoption can be a more reliable indicator of quality because objects reaching such a level are unlikely to have been influenced by social processes.

3. Social Learning in Complex Networks.

Presenting Author

Daniel Barkoczi, Max Planck Institute for Human Development, Berlin, Germany

Co-authors

Mirta Galesic, Max Planck Institute for Human Development, Berlin, Germany

Konstantinos Katsikopoulos, Max Planck Institute for Human Development, Berlin, Germany

Research on social learning in humans and other animals has produced a diverse list of empirically observed strategies in the wild (Laland, 2004; McElreath, et al 2008), but lacks clear-cut theoretical predictions of when and why different strategies should be observed empirically. Most theoretical models ignore the network structure of the social environment and focus only on the decision phase (e.g. imitate-the-majority, imitate-the-best) of implementing a strategy, but disregard the way information is collected (e.g. sampling phase). The goal of the present study is to fill this gap by explicitly modeling the network structures agents are embedded in and to study different social learning strategies by modeling their building blocks (search, stop, decision rule). We hypothesized that imitate-the-best would typically outperform imitate-the-majority, however, imitate-the-majority with small samples would perform better than the same strategy with large samples. In line with previous work we also expected to find an effect of network efficiency (e.g. average path length) on relative performance of different strategies. In systematic simulations we found support for our hypotheses regarding the performance of different strategies and found that this effect is mediated by network efficiency. More efficient networks promoted faster recovery after environmental change. Our findings highlight the importance of considering the structure of the social environment and the building-blocks of strategies in the study of social learning.

4. Sampling Popular Alternatives can Lead to Collective Illusions.

Presenting Author

Gaël Le Mens, Universitat Pompeu Fabra, Spain

Co-authors

Jerker Denrell, Warwick Business School, University of Warwick

Societies and groups sometimes stick to the status quo instead of switching to superior alternatives. Existing explanations often attribute this to motivated cognition, inferences from

popularity, or a coordination failure due to payoff externalities: people may know that another alternative is superior but nobody has an incentive to switch unless many others do so. We show that a simple learning argument can provide an alternative explanation. In our model, agents are more likely to try the more popular alternative, i.e., the alternative believed by most to be the superior. But agents' quality estimates are solely based on their own experiences with the alternatives. We show that when agents are more likely to sample the more popular alternative, an information bias emerges that leads most agents to believe that the quality of the more popular alternative is superior to that of the less popular alternative. This happens even if the more popular alternative is of inferior quality. The intuition behind this result is that if the inferior alternative is the more popular, and most people mistakenly believe it is superior, this collective error is unlikely to be corrected. When people tend to sample the popular alternative the unpopular but superior alternative is avoided. Therefore people will not discover that the unpopular alternative is in fact the best. Our model neither assumes that agents engage in motivated cognition nor that they make inferences about quality on the basis of popularity. Our model thus provides a novel, sampling-based, for the persistence of collective illusions. It also explains how voting can lead to attitude homogenization within groups and how a coordination motive can lead to inaccurate collective beliefs.

5. Similarity, Organizational Clustering, and Simple Identities.

Presenting Author

Christina Fang, Stern Business School, USA

Co-authors

Ji-hyun (Jason) Kim, Yonsei University, South Korea

Joe Porac, Stern Business School, USA

How are two organizations considered similar? A simple answer seems to be: They are considered "similar" if they have certain characteristics in common. We explore a preliminary yet important question – how would the number of attributes influence the ease of forming similar clusters, which in turn gives rise to the emergence of categories?

Our model modifies the classic Schelling model by having each agent characterized by m attributes, each of which is a binary variable. Agents respond to their Moore neighborhood composition: If one's neighborhood similarity (calculated by following Tversky 1977) falls below a threshold (which we parameterize as TH , which ranges from 0.0 to 1.0), he migrates to a

randomly chosen part of the lattice that meets his threshold.

We find that emergence of similarity is less as number of attributes increases. Smaller number of attributes tends to be associated with better ease of category emergence. In other words, category formation requires simple identities. Adding more binary dimensions progressively weakens the clustering effect. Theoretically, we should be able to eliminate clustering altogether by increasing attribute comparisons to infinity. This further implies that agents clusters are small number phenomena, where attributes are uncorrelated, clusters can only form around "simple" identities.

Symposium IX: Improving Judgments and Decisions II - Individual Decision Making Q-401

Chair and Discussant: Emre Soyer

1. The surprise of being helped: a comparison of medical and consumer choices made with different choice architectures.

Elena Reutskaja, IESE Business School*

Barbara Fasolo, London School of Economics

We investigate the effect of three different decision aids or "choice architectures" – Best-First, Best-in-Hotspot and Opt-Out-Default – on quality of decision and information processing across two different choice context: consumer (choice of a hotel for one's holiday) and medical (choice of a hospital for an elective surgery). Choice quality was measured as proportion of people choosing the 'best' as defined by "objective" quality attributes provided by experts. After a series of focus groups, we ran a large-scale field experiment in which participants made two successive consumer and medical decisions from an online scorecard. We trace decision strategies employed by participants prior to their decision using mouse-tracking methods. Firstly we find that all three decision aids lead to better choice quality in the medical than in the consumer context. Second, which aid leads to highest performance depends on context: we demonstrate that while Opt-Out Default works best in the consumer setting Best-in-Hotspot outperforms the other decision aids in the medical domain. Third, context affects the information acquisition and decision strategies employed by participants prior to their decision. Participants' information search switches from attribute-wise when choosing hotels, to option-wise when choosing hospitals. These data show that there is no optimal decision aid which works best in

both choice environments and that effectiveness of information formats depends on the context (e.g., consumer vs. medical). We therefore call for choice architects in the consumer and medical sector to work with behavioral decision experts in order to achieve the desired outcomes when employing nudges and decision aids.

2. Guided Decision Processes.

Manel Baucells, Universitat Pompeu Fabra*

Rakesh K. Sarin, UCLA Anderson School of Management

The heuristics and bias research program has convincingly demonstrated that our judgments and choices are prone to systematic errors. Decision analysis requires coherent judgments about beliefs (probabilities) and tastes (utilities), and a rational procedure to combine them so that choices maximize subjective expected utility. A guided decision process is a middle-of-the-road between decision analysis and intuitive judgments in which the emphasis is on improving decisions through simple decision rules. These rules reduce cost of thinking, or decision effort, for the myriad decisions one faces in daily life; but at the same time, they are personalized to the individual and produce near optimal choices. We discuss the principles behind the guided decision processes research program, and illustrate the approach using several examples.

3. Creativity in Judgment and Choice.

Craig R. M. McKenzie, Rady School of Management, UC San Diego

Decision making is typically viewed from a rational perspective: For a given decision task, a rational model or principle is usually said to apply, and violations are routinely reported. It follows from this perspective that improving decision making is about increasing rationality, or "debiasing". This talk suggests a different perspective on suboptimal decisions. In this perspective, poor decision making is seen as stemming from a lack of creativity, rather than (or in addition to) a lack of rationality. The "creativity problem" in general (not just in JDM) is that people tend to immediately consider a small number of alternatives when trying to solve problems and choose among actions. People typically view problems too narrowly and fail to generate a sufficiently large menu of options to evaluate thoroughly and choose from. Furthermore, many violations of either coherence or correspondence criteria can be seen as the result of a lack of creativity. For example, overconfidence, hindsight bias, and covariation

assessment errors can all be reduced by having people consider the alternative outcome. Framing effects can be seen as failing to consider how the same information could have been presented differently, and the "fixed pie bias" in negotiation is due to people not considering the opponent's perspective. Increasing creativity, in addition to rationality, is crucial for successful decision making.

4. Illusory correlation in the remuneration of chief executive officers: It pays to play golf, and well.

Gueorgui I. Kolev, EDHEC*

Robin M. Hogarth, Universitat Pompeu Fabra

"Halo" effects induced by illusory correlations can be an important source of judgmental bias when people assess the competence of others for important tasks (e.g., in job selection, political elections). Noting that such effects are especially likely to arise in "wicked" environments that provide poor feedback for learning, we document their presence in decisions concerning the remuneration of CEOs. Specifically, we examine the relations between golf handicaps of CEOs, corporate performance, and CEO compensation. We find that golfers earn more than non-golfers and pay increases with golfing ability. Furthermore golfers perform worse than non-golfers, performance decreases with golfing ability, and when low-ability golfers are appointed as CEOs, there are positive stock price reactions. To overcome possible biases, such as those induced by illusory correlation, we recommend the use of explicit, mechanical rules for making CEO compensation decisions. This would also have the advantage of ensuring a more transparent process.

5. Improving probabilistic inference in competitions.

Emre Soyer, Ozyegin University*

Robin M. Hogarth, Universitat Pompeu Fabra

It is well established that probabilistic inferences are affected by presentation format. Consequently, much attention has been directed at determining *transparent* task descriptions that lead to accurate judgments. However, since it is difficult to generalize from approaches already suggested, we propose an alternative that exploits the human ability to encode

sequentially experienced frequency data. That is, instead of static descriptions, we provide decision makers the opportunity to observe – dynamically – sequences of outcomes from the underlying process as represented by a simulation. We summarize a research program that tests this approach in three areas: classical puzzles in probability theory; an investment decision; and assessing the chances of winning a competition. In all cases, sequentially simulated experience leads to more accurate responses than standard formats; users relate well to the method; and differences due to statistical sophistication are small. We conclude with specific implications for further research.

Symposium X: Emotions and Decision Making Q-402

Chair: Benjamin Scheibehenne & Bettina von Helversen

Discussant: Ellen Peters

1. Selecting Decision Strategies: the Differential Role of Emotions.

Benjamin Scheibehenne & Bettina Von Helversen, University of Basel, Switzerland

Two hypotheses about the influence of specific emotions on strategy selection in decision making are compared. According to the depth-of-processing hypothesis, happiness and anger increase the use of simple non-compensatory strategies that require little cognitive effort whereas sadness should foster reliance on more complex compensatory strategies. In contrast, the focus-of-attention hypothesis predicts that anger and sadness lead to a narrow focus of attention fostering non-compensatory strategies that focus on specific pieces of information, whereas happiness should broaden the focus of attention, fostering compensatory strategies that consider all relevant information. Results of an online study (N = 166) indicate that anger and sadness, induced through video clips, facilitate the use of a non-compensatory take-the-best strategy whereas happiness promotes compensatory decision rules. These results suggest that emotions influence decision strategies primarily by focusing attention on relevant details.

2. Probabilistic inferences under Emotional Stress: Arousal, Attention Narrowing and Decision Strategy Selection.

Szymon Wichary, Interdisciplinary Center for Applied Cognitive Studies (ICACS), Warsaw

Rui Mata, Max Planck Institute Human Development, Berlin

Jörg Rieskamp, University of Basel, Switzerland

Many models of decision making neglect emotional states that could affect individuals' cognitive processes. The present work explores the effect of emotional distress on people's cognitive processes when making probabilistic inferences. Two contrasting hypotheses, the *uncertainty reduction* and the *attention narrowing* hypothesis of how high arousal negative emotional state effects decision making and predecisional information search are tested against each other. In the experimental study emotional distress was induced with highly aversive pictures that were presented briefly before making a decision. Emotional states were assessed by both subjective (state anxiety, arousal and pleasantness ratings) and objective (skin conductance) measures. Results show that emotional stress impacts selection of decision strategies, so that emotionally aroused participants selected simple non-compensatory strategies that focus on the most important information. Consistently, the information search of emotionally stressed participants' was focused on the most valid information. The results are in line with the *attention narrowing* hypothesis and suggest that people respond adaptively to reduction of processing capacity imposed by emotional stress, by selecting simpler decision strategies and by focusing more on the important information.

3. The Influence of Stress on Financial Risk Taking Depends on the Level of Risk.

Bettina Von Helversen, University of Basel, Switzerland

Jörg Rieskamp University of Basel, Switzerland

Many decisions under risk and uncertainty are made under physical or emotional stress. Recent research suggests that stress influences decisions between risky options, but that the influence depends on the characteristics of the decision task. For instance, stress has been found to increase risk taking for gambles in the loss domain, but decrease risk taking for gambles in the gain domain. In the current project we investigate, if the gambles' riskiness (i.e. the variance of outcomes) influences the direction of the stress effect. When considering gambles involving relatively low risk stressed participants became more risk seeking. In contrast, for gambles

involving high risk participants became risk averse. This suggests that the influence of stress depends on the riskiness of the decision task.

4. Does an Expectation Calculus Govern Affect-Rich Risky Choice?

Renata Suter, Max Planck Institute Human Development, Berlin

Thorsten Pachur, Max Planck Institute Human Development, Berlin

Ralph Hertwig, Max Planck Institute Human Development, Berlin

Guido Biele, Max Planck Institute Human Development, Berlin

We developed a paradigm to compare decision-strategies as a function of whether outcomes are affect-rich or affect-poor. Behavioral and fMRI results suggest that qualitatively different choice processes underlie risky choices in the two domains: Risky choices in an affect-poor domain were best modeled by a compensatory strategy that integrates outcome and probability information (prospect theory), whereas risky choices in an affect-rich domain were best described by a non-compensatory strategy that neglects outcome probabilities (minimax). We used fMRI to investigate the neural underpinnings of this apparent difference in strategy use. The patterns of neural activation corroborate the conclusion of the model comparison for behavioral data that risky choices in affect-rich and affect-poor tasks are based on qualitatively different decision mechanisms. Whereas affect-poor choices seem to be based on calculated reward expectations, consequence and probability information are less integrated at the neural level when prospects are affect-rich. Rather, affect-rich choices seem to be driven by the emotional value associated with the different outcomes, indicated by a stronger activation in the anterior insula during the evaluation of affect-rich (relative to affect-poor) outcomes. Our results provide converging evidence from computational modeling and fMRI supporting the notion of contingent strategy use in risky choice.

5. Expected Risks and Returns in Children's, Adolescents' and Adults' Risky Choice: Behavioral Effects and Neural Correlates.

Bernd Figner, Columbia University

Anna Van Duijvenvoorde, University of Amsterdam

Leah H. Somerville, Harvard University

Alisa Powers, Sackler Institute for Developmental Psychobiology

Wouter Weeda, University of Amsterdam

Mauricio Delgado, University of Pittsburgh

Betty J. Casey, Sackler Institute for Developmental Psychobiology

Elke Weber, Columbia University

Hilde Huizenga, University of Amsterdam

It is well documented that adolescence is a developmental phase prone to increased risk taking across different life domains, including substance use, dangerous behavior in traffic, and unsafe sexual behaviors. A currently popular neurodevelopmental model explains this adolescent peak in risk taking as the consequence of differential maturational timelines of earlier-maturing subcortical regions implicated in affective-motivational processes versus later-maturing prefrontal regions implicated in more controlled and deliberative processes. To date, however, the empirical results regarding this model are sparse, mixed, and difficult to reconcile due to strongly varying frameworks that not always follow well-characterized paradigms. We therefore applied a risk-return decomposition to study psychological and neural processes underlying risky choice and risk taking in children, adolescents, and adults in a dynamic risky choice task previously shown to trigger substantial affective processes, the hot Columbia Card Task. Behavioral and neural results indicate (i) monotonically increasing return sensitivity, (ii) risk insensitivity in children, and (iii) adolescence as a developmental phase showing differences in risk processing compared to both children and adults. In addition, (iv) individual differences in risk attitudes were most pronounced during adolescence, consistent with the view that adolescence is a phase of reorganization and thus destabilization. At a conceptual level, our work shows the advantages of using a well-characterized decision-making framework, as it allows precise interpretation of results and clear operationalization of such concepts as risk and return sensitivity, risk aversion, and risk attitude, contributing to a better comparability of studies in this field.

				Wednesday 21st			
9.00am-10.00am	<p>KEYNOTE ADDRESS III: Mind Wondering: Challenges and Benefits. Timothy D. Wilson, University of Virginia, USA</p> <p>Aula Magna</p>						
10.00am-10.45am	<p>De Finetti Award Presentaion Dan Schley Assessing 'economic value': Magnitude representations underlie valuations of riskless and risky prospects.</p> <p>Aula Magna</p>						
10.45am-11.15am	Coffee Break						
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401	Q-402
11.15am-1.15pm	Uncertainty and Probability (V)	Individual Differences in JDM (I)	Risk and Loss Aversion (I)	Symposium XI: Strategy Selection: An Unresolved Modeling Challenge	Symposium XII: The Psychology of Regret: Process, Function, and Form	Symposium XIII: What motivates donation decisions? New perspectives on the mechanisms underlying charitable giving	Consumer JDM (III)
	Chair: Judith Covey	Chair: Rui Mata	Chair: Cleotilde Gonzalez	Chair: Julian N. Marewski & Ulrich Hoffrage Discussant: Julian N. Marewski	Chair and Discussant: Keith Markman	Chair: Stephan Dickert Discussant: Daniel Västfjäll	Chair: Liat Hadar
	The effects of narrowly averting disaster on the perception of future risk. Judith Covey & Qiuyan Zhang	Individual and Age Differences in Exploration-Exploitation. Rui Mata	"Life is like a box of chocolates": Experience, Emotionality of the Context, and Framing Influence What You're Gonna Choose. Cleotilde Gonzalez & Katja Mehlhorn	Selecting between automatic and deliberate decision strategies depends on the ease of information encoding. Arndt Brüder, Anke Söllner, & Benjamin Hilbig	The Neural Mechanisms of Regret and its Role in Decision-making. Antoinette Nicolle	Individual differences and information acquisition in donation decisions: An eye-tracking analysis. Janet Kleber, Sophie Süssenbach, Stephan Dickert, & Arnd Florack	When Knowledge is Demotivating: Metacognitive Knowledge and Choice Overload. Liat Hadar
	The role of ANS-acuity and numeracy for the accuracy of subjective probability judgments. Anders Winman, Marcus Lindskog, Håkan Nilsson, Neda Kerimi, & Peter Juslin	Effects of Personality and Market Returns on Investors' Portfolio Monitoring Behaviour. Svetlana Gherzi, Peter Ayton, Daniel Egan, & Emily Haisley	Contextually sensitive value integration explains loss-aversion in an experimental choice task. Konstantinos Tsetsos, Marius Usher, & Chater Nick	Increasing the precision of decision strategies with ACT-R. Cvetomir M. Dimov, Julian N. Marewski, & Lael J. Schooler	The Role of Counterfactual Thinking and Regret in Behavior Regulation: Testing the Relationship Between Counterfactual Thinking and Behavioral Intentions. Rachel Smallman	Using agent based modeling to enhance charitable giving in a population. Dorina Hysenbelli, Andrea Ceschi, Daniel Västfjäll, & Paul Slovic	Is it too many always too much? An exploratory study on group decision making and choice overload. Nuno Jose Lopes, Elena Reutskaja, & Mario Capizzani
	Using Ratio Scaling to Assess Likelihood of Joint Events. Han-Hui Por, & David V. Budescu	Gender Differences in Decision Biases. Aba Szollosi, Bence Bago, Andrei Foldes, & Balazs Aczel	Extending the psychometric paradigm: Fragility and morality as components of judgments of societal risk. Gisela Böhm, Claudia Bassarak, & Hans-Rüdiger Pfister	Model identification in managerial decisions: Can observers infer strategies from observing choices? Sebastian Hafenbraedl, Ulrich Hoffrage, & Julian N.	Regret as a Moving Target: The Dynamic Opportunity Principle. Amy Summerville	Understanding the developmental sources of scope insensitivity in helping behavior. Tehila Kogut, Paul Slovic, & Daniel Västfjäll	Temporal Discounting of Hedonic and Utilitarian Rewards: The Effect of Outcome Related Affect On Time-Sensitivity. Selcuk Onay & Valeria Noguti
	Utilization of Probabilistic Cues in the Presence of Irrelevant Information: A Comparison of Risky Choice in Children and Adults. Tilmann Betsch	Getting older isn't all that bad: Better decisions and coping when faced with sunk costs. Wandt Bruine de Bruin, Andrew M. Parker, & JoNell Strough	Gamble Evaluation and Evoked Reference Sets. Craig R. M. McKenzie & Shlomi Sher	Towards modeling strategy selection based on internet statistics. Daniela Link & Julian N. Marewski	Opportunity Perceptions Determine the Intensity of Regrets That Arise From Maintaining the Status Quo. Keith D. Markman	Donation Decisions: A Conflict Between Cost for the Donor and Benefit for the Recipients. Enrico Rubaltelli & Paul Slovic	The Effect of Casual Structure on Preference for Products Offering Two Benefits versus a Single Benefit. Kelly Saporta, Shai Danziger, & Steven
	The effect of conviction severity and base-rate in interpreting linguistic probability expressions. Egle Butt, Gaelle Villejoubert, Marie Juanchich, & Frédéric	Individual and age-related differences in decision structuring: The case of option generation. Fabio Del Missier, Mimi Visentini, & Timo Mäntylä	The Effect of Probability 'Control' on Risk Taking. Shweta Agarwal	Using Bayesian Statistics to Evaluate and Test Cognitive Toolbox Models. Benjamin Scheibehenne, Jörg Rieskamp, & E. J. Wagenmakers	Universality and Cultural Variation in the Experience of Regret. Marcel Zeelenberg	How mental images and impact judgments influence charitable giving: The case of identifiability and magnitude effects. Stephan Dickert, Janet	Scale and metric design as choice architecture tools. Adrian R. Camilleri & Richard P. Larrick
1.15pm-2.15pm	Lunch (South Campus)						
2.15pm-4.15pm	<p>Early Career Networking Event Coordinator: Jon Jachimowicz (Q-101)</p>						
8.00pm	Gala Dinner in "El Cangrejo"						

Wednesday 21st

10.00am- 10.45am



De Finetti Award Presentation

Dan Schley

Assessing 'economic value': Magnitude representations underlie valuations of riskless and risky prospects.

Aula Magna

The EADM is pleased to announce the 2013 De Finetti Prize has been awarded to Dan Schley for his paper entitled "Magnitude representations underlie valuations of riskless and risky prospects." The jury that awarded the prize consists of Mandeep K. Dhami (chair, and former winner), Shoham Chosen-Hillel (2011 winner), Karl Teigen, and Cilia Witteman.

Dan Schley is a graduate student in the psychology department at the Ohio State University. His primary research concerns the psychology of judgments and choice. Dan is particularly interested in the integration of numerical cognition research (i.e., how the mind processes numbers) with theories of choice in psychology, marketing, and behavioral economics.

Parallel Sessions

11.15am–1.15pm

Uncertainty and Probability (V) Q-101

Chair: Judith Covey

1. The effects of narrowly averting disaster on the perception of future risk.

Judith Covey & Qiyuan Zhang Durham University, UK

People's attitudes towards risks can be shaped not only by their past experiences with real mishaps but also by near-miss incidents. When an accident or mishap has been narrowly averted this can be equally alarming to people in predicting future accidents (Teigen, 2005). However, the recent occurrence of adverse events has also been found to reduce the perceived probability of their future recurrence – particularly if the event is historically rare and determined by inanimate chance processes rather than human performance (Ayton & Fischer, 2004; Barron & Yechiam, 2009). It is unknown however where this 'negative recency' effect also applies to near-misses. The experiment reported here therefore tested whether the potency of near-misses is moderated by the same factors affect the potency of actual events – i.e., historical frequency (rare or frequent), recency (close or distant), and causal mechanism (inanimate or human factors).

2. The role of ANS-acuity and numeracy for the accuracy of subjective probability judgments.

Anders Winman, Marcus Lindskog, Håkan Nilsson, Neda Kerimi, & Peter Juslin, Uppsala University (Sweden)

In last years, there has been an increasing interest in how people's ability to represent and process numbers affects their ability to make sound judgments and decisions. Research has for example indicated that people who are relatively poor at representing and/or processing numbers are more sensitive to framing effects and make less accurate risk estimates. The aim of the present paper is to explore if the accuracy of probability judgments is affected by the ability to represent and process numbers. The issue is important not least because it often is assumed

that an ability to assess accurate probabilities is a prerequisite for informed decisions.

Calibration (correspondence) and prevalence of conjunction fallacies (coherence) are used as measures of accuracy. Imagine that a judge is presented with a set of statements and is asked to judge the probability, p , that each statement is true. Imagine that the person respond $p=.6$ for m statements. If 60% of the m statements are in fact true, then the judge is perfectly calibrated on this probability-level. If less (more) than 60% are true, then the person is overconfident (underconfident). Imagine that a person is asked to estimate the probability of constituent event A (p_A) and the probability of conjunctive event $A \cap B$ (p_{AB}). In this case, a conjunction fallacy is committed if $p_{AB} > p_A$.

The ability to represent numbers is often separated from the ability to process numbers. The ability to represent numbers is typically measured by the acuity of the Approximate Number System (ANS). The ANS is a non-symbolic system for representing quantities. A person that has a relatively acute ANS is a person that can detect relatively small changes in numerosity. The ability to process numbers is measured by level of numeracy which typically is measured by having people to solve a set of more or less difficult mathematical problems.

3. Using Ratio Scaling to Assess Likelihood of Joint Events.

Han-Hui Por, & David V. Budescu Fordham University, Bronx, New York (United States)

We compare direct assessments of events' probabilities with indirect derivations in terms of accuracy and adherence to probability axioms. Derivation approaches include the (a) normalization of the direct estimates of joint events, (b) aggregation of indirect joint probabilities from its marginal and conditional probabilities and (c) derivation from relative ratio judgments. Past findings suggest that the use of "head" (intuition) estimates as inputs for "formula" (mechanical or statistical) combination yields more accurate estimates than the use of direct, intuitive insight alone. We presented subjects with two pairs of events: (i) smoking & lung cancer and (ii) weather & stock market gains and found that, in general, indirect estimates are more internally consistent than direct estimates and that accuracy of the ratio-scaled estimates far exceeded those in the other approaches. We further supported our empirical findings that the indirect and ratio-scaled estimates are inherently superior to direct estimates with simulations of the judgment process. We discuss the advantages of pair-wise comparisons as an assessment method for uncertain events. First, ratios are inherently more intuitive for respondents when judging probabilities of uncertain events. Further, compared to direct estimation of joint events which requires that subjects hold four exclusive joint events in mind

for comparisons, relative ratios only require two for pair-wise comparisons. Finally, the computation ensures that the ratio-scaled estimates are internally consistent which facilitates interpretation of the derived estimates.

4. Utilization of Probabilistic Cues in the Presence of Irrelevant Information: A Comparison of Risky Choice in Children and Adults.

Tilman Betsch, University of Erfurt Germany

Are children able to utilize probabilistic information in decision making? We present 3 studies to address this question. In the first, we studied risky choices in preschoolers (6y.), elementary schoolers (9y.), and adults (23y.) using an information-board paradigm crossing two options with two cues that differ in their probability of making valid predictions ($p = .50$ vs. $p = .83$). We also varied the presence of normatively irrelevant information. Choice patterns indicate that preschoolers were able to base their decisions on weighted values. In comparison to elementary schoolers and adults, however, they failed to prioritize probabilistic information over irrelevant information as a decision weight. Preschoolers were especially prone to rely on feedback and apply a suboptimal change-after-failure strategy. Two further studies employed an environment with three probabilistic cues (validities: .83, .67, .50). Presence of irrelevant information ("lure" associated with .83-cue, .50-cue, or absent) and presentation format (hidden vs. open board) were varied. Compared to the first study with only two cues, cue utilization was higher in all age groups. Still, the majority of children failed to use probabilistic cues as systematically as adults did. Holistic consideration of information was generally higher in the open format in which all information could be inspected at once. In the hidden format, which required sequential search, irrelevant information biased choices in preschoolers, whereas in an open format, older children and adults were also susceptible to be biased by the lure. The results indicate that children were able to use weighting operations in their decisions although they lacked a proper understanding of the importance of probabilities

5. The effect of conviction severity and base-rate in interpreting linguistic probability expressions.

Egle Butt, Kingston University

Gaëlle Villejoubert, Kingston University

Marie Juanchich, Kingston University

We explored the effect of severity and base rate on numerical estimates of verbal probability and examined how these factors influence the meaning attributed to a verbal probability used to characterize (1) the chances that a suspect might be convicted in an assault case, (2) the likelihood of his conviction, and (3) the likelihood of his guilt. Face-management interpretations of the phrase "It is possible that" were expected to be preferred over likelihood communication interpretations when the conviction base-rate for similar cases was high (4 convictions out of 5 cases) as well as when the conviction sentence was severe (2 years vs. 2 months imprisonment). It was also expected that the prevalence of face-management interpretations in those instances would result in higher estimates of guilt and conviction likelihood. Judgments and interpretations were collected in an online study using a 2 × 2 between-subject design. As anticipated, participants tended to interpret possible as a face-management device rather than a likelihood communication device with high base-rate convictions. High conviction base rates also led to higher perceived likelihood of conviction but they did not affect guilt judgments. Contrary to our expectations, neither linguistic interpretations of possible, nor conviction likelihood or guilt judgments were affected by our manipulation of conviction severity. This study confirms that the base rate of an event might influence the linguistic interpretation of verbal probability phrases and the event perceived likelihood of occurrence. Further research will need to establish whether the absence of reliable effect of severity was due to an unsuccessful manipulation of severity or to the fact that linguistic interpretations are only moderated by base rates.

Individual Differences in JDM (I) Q-102

Chair: Rui Mata

1. Individual and Age Differences in Exploration-Exploitation.

Rui Mata, Max Planck Institute for Human Development

Andreas Wilke, Clarkson University

Uwe Czienskowski, Max Planck Institute for Human Development

Any search or foraging act represents a balance between exploration and exploitation: On the

one hand, one must search or explore the environment in order to find and learn about desired resources; on the other hand, one must exploit those resources in order to accumulate gains. Consequently, striking a balance between exploration and exploitation is the key to successful search. But what are the mechanisms underlying the control of exploration-exploitation trade-offs and how are such mechanisms affected by aging? We report data from two foraging tasks used to investigate individual and age differences in search in external environments ($N = 150$) as well as internal search in memory ($N = 159$). Overall, the evidence suggests that exploration behavior shows reliable individual differences and undergoes significant changes across the life span across internal and external search. We discuss these findings in light of theories that postulate a link between cognitive control abilities and exploratory behavior.

2. Effects of Personality and Market Returns on Investors' Portfolio Monitoring Behaviour.

Svetlana Gherzi, University of Warwick

Daniel Egan, Betterment LLC

Emily Haisley, Barclays Wealth Management

Peter Ayton, City University London

Karlsson, Loewenstein & Seppi (2009) found that, following market upswings, investors are more likely to monitor their retirement portfolios; they concluded that, when facing bad market conditions, rather like (apocryphal) ostriches sticking their heads in the sand, investors avoid unpleasant information. We apply generalized non-linear mixed effects models to test for this selective information monitoring at an individual level in a sample of active online investors. The results indicate that investors increase their portfolio monitoring following both positive and negative market returns, behavior more akin to the hyper-vigilance exhibited by meerkats than burrowing ostriches. We accordingly term the observed behavior the meerkat effect. A rise in the index of market uncertainty (VIX), independent of market direction, is also associated with increased monitoring. Moreover, we find investors' personality interacts with daily market returns; neurotic investors monitor their portfolios less frequently, possibly as an anxiety controlling mechanism. However, during extreme positive or negative market changes, they monitor their portfolio more than non-neurotic investors. We consider possible explanations as to why our investors reacted differently to those previously reported.

3. Gender Differences in Decision Biases.

Aba Szollosi, Bence Bago, Andrei Foldes, & Balazs Aczel, University of ELTE, Budapest, Hungary

Unequal perception of female and male aptitude for higher-level decision making is greatly responsible for the existing barriers to women's career progression. This detrimental effect of stereotypical attitudes is especially apparent in the domain of business decision making. With the exception of a handful of topics (e.g., risk-aversion, overconfidence), an overview of the literature showed surprisingly little effort in the field to understand the gender differences in the behavioural aspects of decision making.

The fact that earlier work assessing individual differences in decision making scarcely reported the results from a gender perspective, as well as, some methodological issues in the previous assessment tools leave the question unresolved and necessitates more focused exploration of the topic. This study aims to examine the empirical basis of gender differences in decision biases and fallacies using a novel assessment tool.

4. Getting older isn't all that bad: Better decisions and coping when faced with sunk costs.

Wandi Bruine de Bruin, Leeds University Business School Centre for Decision Research and Carnegie Mellon University Department of Engineering & Public Policy

Andrew M. Parker, RAND Corporation

JoNell Strough, West Virginia University, Department of Psychology

Because people of all ages face decisions that affect their quality of life, decision-making competence is important across the life span. Relatively little is known about the relationship of aging with decision making, because most decision research has been with college students. Here, we examine age-related changes in one crucial decision skill, the ability to avoid "sunk cost errors" or to discontinue failing commitments despite having made prior investments. Older adult age has been associated with avoiding sunk-cost errors, but the explanatory mechanism is unclear. Based on new insights from the life span developmental literature, we hypothesized that older adults would be more likely than younger adults to avoid sunk-cost errors because of their better ability to emotionally cope with irrecoverable losses, as seen in avoiding ruminative negative thoughts about the past.

5. Individual and age-related differences in decision structuring: The case of option generation.

Fabio Del Missier, University of Trieste, Italy

Mimi Visentini, University of Trieste, Italy

Timo Mäntylä, University of Stockholm, Sweden

Although decision-structuring abilities, like option generation, are essential for real-world decision making, only few studies have investigated their underlying processes, and the role of individual differences has been almost ignored. We carried out two studies to shed light on the cognitive processes underlying option generation and to evaluate the influence of age-related differences on option generation. In both studies, participants were required to: (a) generate options to solve realistic decision-making problems (adapted from previous research), (b) choose the best option, and (c) complete a series of tests measuring various aspects of cognitive ability, divergent thinking, and experience in the domain. In Study 1 young adults generated significantly more frequent (and varied) options than older adults. Structural equation modeling showed that the difference in option generation fluency was partially mediated by ideational fluency but not by the cognitive reflection test, a measure of rational thought and a proxy for cognitive ability. Age differences in the utility of generated options varied with the decision problem. Study 2 confirmed the prominent role of ideational fluency in young adults' option generation fluency, with executive control of retrieval playing a smaller indirect role. The results expand our understanding of the multi-componential nature of decision-making competence and its underlying processes in the context of cognitive aging.

Risk and Loss Aversion (I) Q-103

Chair: Cleotilde Gonzalez

1. "Life is like a box of chocolates": Experience, Emotionality of the Context, and Framing Influence What You're Gonna Choose.

Cleotilde Gonzalez & Katja Mehlhorn, Carnegie Mellon University (United States)

We show how a well-known bias in risky choice, the framing effect, is influenced by two

important characteristics of real-life decision-making: The format in which information is obtained (from description or experience) and the emotionality of the decision context. A framing effect in risky decisions results in risk aversion in problems framed as "gains" and risk seeking in problems framed as "losses," even when the problems are objectively equivalent. We found a framing effect only in emotional decisions from description. There was no framing effect when decisions were made in non-emotional contexts or from experience. In non-emotional contexts, participants showed a general frame-independent risk aversion. Participants' choices in decisions from experience are explained by bounded maximization behavior proposed by Instance-Based Learning Theory: people are generally motivated to maximize their outcomes but do so within the cognitive constraints imposed by their memory and learning mechanisms.

2. Contextually sensitive value integration explains loss-aversion in an experiential choice task.

Konstantinos Tsetsos, Department of Experimental Psychology, Oxford University

Marius Usher, School of Psychological Sciences, Tel Aviv University

Chater Nick, Warwick Business School, University of Warwick

Human choices exhibit several regularities that violate the principles of rationality. In a previous study we examined such patterns in experiential tasks that require choices between fast sequences of gains. We found that risk biases and preference reversals fall out from a simple serial value-integration mechanism that prioritizes the processing of extremely high (salient) values. In the present study, participants saw two rapidly presented numerical sequences that could have both positive (gains) and negative values (losses), and had to choose the one from which they wanted to receive an extra reward sample. In some trials, the two sequences were zero-mean Gaussians with different variances (low vs. high). If losses loom larger than gains, as established in several studies of "description-based" choices under risk, participants should avoid the high-variance sequence. Contrary to this prediction, we found that people were risk-neutral. Nevertheless, when the presentation order was manipulated to induce temporal correlations, such that a loss in one sequence was always paired with a loss in the other (and the same for gains i.e. "concurrent" pairing) people avoided the high-variance option showing risk-aversion. Because the two conditions differed only in the presentation order and not in the actual presented values, the reported risk-preference reversal rules out the loss/gains asymmetric representation hypothesis. We propose that the different presentation in the two conditions changes people's strategy from minimizing the loss to maximizing the gain. We accommodate

these results within the salience-based computational framework and we claim that risk-biases do not reflect asymmetries in value representation but contextual sensitivity during value integration.

3. Extending the psychometric paradigm: Fragility and morality as components of judgments of societal risk.

Gisela Böhm (presenting author), University of Bergen, Norway

Claudia Bassarak, Leuphana University Lüneburg, Germany

Hans-Rüdiger Pfister, Leuphana University Lüneburg, Germany

We investigate whether fragility and morality structure the cognitive representation of complex societal risks such as climate change, in addition to the classic psychometric dimensions dread and unknown risk. We propose fragility as a novel relevant property of risks, referring to two aspects: (a) the scientific evidence of a risk issue is perceived as being uncertain and scientific consensus is perceived as low, and (b) the public debate about the risk issue appears multifarious and controversial. Fragility implies uncertainty about what is correct (epistemological uncertainty) and about how to evaluate the risk issue (evaluative uncertainty). Furthermore, we propose that moral evaluations play an important role and examine the status of both fragility and morality within the psychometric framework. In a survey, 506 participants evaluated 24 risk issues on 19 attributes measuring fragility, morality, dread, unknown risk, and overall riskiness. A principal component analysis yields three dimensions of the cognitive representation of societal risks: fragility, a common dimension of dread and morality, and unknown risk. Thus, fragility was identified as a distinct and independent dimension. Morality, in contrast, is blended with dread. When predicting ratings of overall riskiness, morality proved to be the strongest predictor. Interestingly, fragility and morality interacted in predicting overall riskiness such that risk issues perceived as both fragile and morally reprehensible were perceived as particularly risky. We propose that moral values act as filters in the processing of risk information that can be especially powerful when that information is ambiguous, as is the case for fragile risks.

4. Gamble Evaluation and Evoked Reference Sets.

Craig R. M. McKenzie, UC San Diego (United States)

Shlomi Sher, Pomona College (United States)

Slovic et al. (2002) asked some participants to rate the attractiveness of a gamble involving winning \$9 or winning nothing. Other participants were presented with the same gamble, except that winning nothing was replaced with losing 5 cents. Adding the potential loss of 5 cents made the gamble more attractive, even though it is strictly worse than the "win nothing" gamble. This effect has previously been explained in terms of the small loss increasing the affective evaluability of \$9. Three experiments supported an alternative account in which the different gambles evoke different reference sets for comparison. When the gamble involves only wins, the evoked reference set consists of gambles involving only wins. Because winning nothing is the worst possible outcome when only wins are involved, the gamble is judged to be relatively unattractive. When the small loss is added, the evoked reference set is gambles involving wins and losses. Because a 5 cent loss is about as good as a loss can be, the gamble is judged to be relatively attractive. Gambles are evaluated relative to the contexts their features, or their feature descriptions, evoke.

5. The Effect of Probability 'Control' on Risk Taking.

Shweta Agarwal (PhD student, London School of Economics)

In some real-world decisions, people often have an opportunity to modify the risks, either by altering the probabilities or the outcomes, before they choose between risky decisions. Studies on the topic of 'control' have suggested that people find gambles where probabilities are 'controllable' (e.g. depend on skill) more attractive than pure chance gambles. A novel study is designed to investigate whether 'control', defined as the opportunity to alter the probabilities of a gamble, before playing it, can affect risk-taking and tested for three types of gambles—gains-only, losses-only and mixed gambles. To test for the effect of control, two theoretically equivalent sets of binary choice gambles are designed where in one set the choice is between a fixed probability modification on any one of two gambles (both of which will be played), whereas in the second set the choice is simply between playing one of two gambles. For decisions without control, in all domain types the choice patterns are found to be consistent with the four-fold pattern of risk attitudes predicted by cumulative prospect theory, whereas for decisions with control individuals are generally risk averse and risk seeking only when the probabilities of gains (losses) is very high (low). When probabilities can be controlled and the prior probability of gain (loss) is not very low, it is found that more (less) risk is accepted for gains (losses and mixed) gambles. There is also evidence that control is preferred more when it

eliminates uncertainty of unfavourable outcomes from gambles or makes sure losses probable. The implications of this research for understanding managerial attitudes to risk are discussed.

Symposium XI: Strategy Selection: An Unresolved Modeling Challenge

Q-301

Chair: Julian N. Marewski & Ulrich Hoffrage

Discussant: Julian N. Marewski

1. Selecting between automatic and deliberate decision strategies depends on the ease of information encoding.

Arndt Bröder, Anke Söllner, & Benjamin Hilbig

The idea of automatic decision making that approximates normatively optimal decisions without necessitating much cognitive effort is intriguing. Whereas recent findings support the notion that such fast, automatic processes explain empirical data well, little is known about the conditions under which such processes are employed (i.e., strategy selection). We investigate the role of the presentation format of information, focusing explicitly on the ease of information acquisition and encoding. In a probabilistic inference task, the usual matrix employed in prior research was contrasted with a "map" presentation format and additional alterations of both presentation formats. Across three experiments, a robust presentation format effect emerged: Automatic decision making was more prevalent in the matrix (with high information accessibility), whereas sequential decision strategies prevailed when the presentation format demanded more information acquisition effort as in the "map". In addition, findings showed that not the presentation format per se, but the extent of controlled search necessitated by a format drives this effect. Thus, if information is accessible with only minimal need for information search, information integration is likely to proceed in a perception-like, holistic manner. In turn, already a moderate demand for information search hampers automatic information integration.

2. Increasing the precision of decision strategies with ACT-R.

Cvetomir M. Dimov, Julian N. Marewski, & Lael J. Schooler

In inference, central research questions are whether and when people rely on non-compensatory as opposed to compensatory decision strategies. Answering these questions is non-trivial, because there is a large overlap between the outcome predictions different strategies make. Typically, additional dependent variables are needed to distinguish between different strategies' predictions. One such variable is the decision times associated with using a strategy. Yet, even well-researched strategies are often not specified in sufficient amount of detail to quantitatively predict decision times. We provide a primer on how cognitive architectures such as ACT-R allow increasing the precision of decision strategies. An architecture is a quantitative theory that formally integrates models of memory, perception, action, and other aspects of cognition. The cost that one has to pay when implementing underspecified strategies in a detailed quantitative theory is the proliferation of possible implementations of each strategy. To filter out the unrealistic ones, we developed the instruct-paradigm, in which participants are instructed to rely precisely on one strategy (for a similar approach, see Khader et al., 2011). The memory, response and decision time data collected is then used to identify the correct ACT-R implementation of each strategy. We built ACT-R models of three classic strategies – the weighted-linear model, the unit-weight model, and take-the-best – ran an experiment with the instruct paradigm, and identified the correct ACT-R implementations of each strategy. Interestingly, the decision times associated with subjects' usage of take-the-best were concordant with previous research, while those associated with the unit-weight model were much faster than one would expect from past work.

3. Model identification in managerial decisions: Can observers infer strategies from observing choices?

Sebastian Hafenbraedl, Ulrich Hoffrage, & Julian N. Marewski

Strategy selection and model identification are two sides of the same coin. While strategy selection implies that individuals select among different strategies to accomplish a given task, model identification makes an attempt to infer which strategy could have generated individuals' behavior. We focus on the relationship between strategy selection and model identification in the domain of managerial decision making.

In seven studies, over 1,200 participants assumed the role of a manager and had to select, in a series of pairs, one of two suppliers, each described in terms of the consequences that choosing this supplier had for shareholders, the supplier himself, customers, employees and society as a

whole. Normative management theories prescribe that managers' decisions should be guided by specific intentions. Specifically, shareholder value orientation suggests that managers should strive for maximizing shareholder value, whereas stakeholder theory prescribes that managers should intend to be fair towards all legitimate stakeholders. We demonstrate (i) that these normative theories can be described in terms of linear strategies with specific weighing schemes and that (ii) various variables (e.g., whether the company is indebted) influence participants' strategy selection. The results of our studies suggest that (iii) it is often difficult if not impossible to correctly discriminate between underlying intentions (e.g., profit maximization vs. fairness towards stakeholders) when solely observing choices. This finding does not only have methodological implications, but is also of practical importance: Managerial decisions often lead to scandals, focusing the public's attention on questions such as which strategies managers have used and what their intentions have been.

4. Towards modeling strategy selection based on internet statistics.

Daniela Link & Julian N. Marewski

Recently, Marewski and Schooler (2011) proposed an ecological model of strategy selection. According to the model, the interplay between memory and the environment leads to different memory states in which a person can be. For example, when making inferences such as which of two consumer goods is of higher quality, a person can recognize neither of the product names or recognize one or both of them. Each of these memory states affords using different strategies to make inferences about the products, with, for instance, the recognition heuristic (Goldstein & Gigerenzer, 2002) requiring a person to recognize one of two product names. Which memory state a person will be in, in turn, depends on the person's past exposures to the products' names in the environment. It is this interplay between the cognitive system and the environment that carves out for each strategy a cognitive niche, or put in other words, a limited number of situations in which the strategy can be applied. While Marewski and Schooler's model has been successful in predicting the niches of a number of simple decision heuristics, currently the model remains silent about the niches of more complex decision strategies that rely on detailed knowledge about an object's attributes. In an experiment and computer simulations, we extend Marewski and Schooler's model to carve out the niches of this type of knowledge-based strategies. Our extended model relies on internet statistics to predict people's detailed knowledge about objects from the world, the associated retrieval time distributions as well as the cognitive niches of knowledge-based strategies such as weighted-additive decision rules, the take-the-best heuristic, unit-weight linear strategies, or the take-the-first-cue heuristic.

5. Using Bayesian Statistics to Evaluate and Test Cognitive Toolbox Models.

Benjamin Scheibehenne, Jörg Rieskamp, & E. J. Wagenmakers

Many theories in judgment and decision making assume that people have a repertoire or "toolbox" of different strategies available to them from which they choose more or less adaptively depending on the environment. However, despite its wide-spread use, there are a number of reasons that make it difficult to falsify toolbox models and to empirically test them against alternative models of cognition. In particular, testing toolbox models requires that each strategy included in the toolbox is thoroughly defined, that the number of strategies considered as candidates for a particular toolbox is set, and that there is a theory on how strategies are selected from the toolbox. Also, a statistical model is required to quantify the complexity inherent in each toolbox and to provide a common metric for model comparison.

Here, we lay out possible pathways that allow comparing and testing toolbox models as a whole based on Bayesian techniques. We specify a theory of how the selection process of strategies could be described. Based on model recovery simulations and on empirical data we further show how Bayesian concepts can be used to decide how many tools a toolbox should contain to best describe choice data from single individuals and for groups of people as a whole.

Our results indicate that Bayesian techniques are well suited to decide on how many strategies to include into a cognitive toolbox and to test and compare toolbox models as a whole. This addresses an important point of critique of toolbox approaches in general, because due to its higher degrees of freedom, a repertoire that includes many cognitive strategies will always provide a better fit to the data, but it will not necessarily provide the best explanation of the underlying choice processes.

Symposium XII: The Psychology of Regret: Process, Function, and Form Q-302

Chair and Discussant: Keith Markman

1. The Neural Mechanisms of Regret and its Role in Decision-making.

Antoinette Nicolle, University of Hull, UK

Studies exploring the neural mechanisms of regret have sometimes been forced to reduce the construct of regret to such a simplistic form that it is in danger of losing many of its interesting qualities. More recently, however, some studies have explored the extent to which neuronal responses associated with the experience of regret follow the patterns predicted by the established psychological literature. For example, do regret-related neuronal responses depend upon the individual's feeling of control or self-blame, or on the perceived justifiability of the choice? We measured brain responses as healthy individuals made reward-driven decisions, involving systematically varying sense of responsibility for their outcomes. The results show that the way the brain processes regret-related outcomes (i.e. outcomes that could have been better had a different choice been made) depend on both objective and subjective aspects of responsibility. In a second experiment, we provide evidence for action-inaction asymmetries in the neural correlates of regret, as is also in keeping with the psychological literature on regret. Specifically, activity in bilateral anterior insula and medial prefrontal cortex is greater when an individual makes a mistake associated with an action, compared to a mistake associated with a failure to act. Moreover, such responses predict a bias to refrain from acting in future decisions. Together these studies further support current psychological theories concerning the phenomenology regret and its behavioral effects. Moreover, they demonstrate the value of combining economic, cognitive neuroscience and psychological

2. The Role of Counterfactual Thinking and Regret in Behavior Regulation: Testing the Relationship Between Counterfactual Thinking and Behavioral Intentions.

Rachel Smallman, Texas A&M University, USA

Although counterfactual thinking and regret can be harmful, they may also have a more positive influence by helping to regulate future behavior. Accordingly, counterfactual thinking and

regret can improve behavior by eliciting insights about a particular problem. In turn, these insights create a connection between the counterfactual and the desired behavior, activate relevant behavioral intentions, and improve future performance. The current research applied a recently developed sequential priming paradigm to better understand the mechanisms underlying this pathway. A first series of studies focused on establishing the connection between counterfactual thinking and behavioral intentions. Results showed that counterfactual thinking facilitated the formation of relevant behavioral intentions. This effect was content-specific, in that counterfactual thinking only facilitated behavioral intentions that were relevant to the problem at hand. A second set of studies examined how the content of the counterfactual and the behavioral intention influenced the effectiveness of this pathway. By manipulating whether the counterfactual and behavioral intention focused on changing a specific behavior, a category of behaviors, or a trait, these studies provided evidence that counterfactual thinking is most effective at regulating behavior when both the counterfactual and behavioral intention focus on a specific action or behavior. Additional studies tested whether this relationship is sensitive to changes in temporal distance. Findings showed that counterfactuals facilitated behavioral intentions when either the negative event occurred in the recent (vs. distant) past or the intention was framed to occur in the near (vs. distant) future. Together, these studies further clarify our understanding of how counterfactual thinking and regret can help regulate future behavior.

3. Regret as a Moving Target: The Dynamic Opportunity Principle.

Amy Summerville, Miami University, USA

Research on the experience of regret generally examines regret at a single moment in time. However, considering change in regret over time offers a new understanding of the role of opportunity in the experience of regret. The current research used a longitudinal approach to examine both initial severity and the rate of change in immediate regrets occurring at the time of a meaningful life outcome. Initial severity was associated with greater past control over the outcome and lower levels of future ability to attain goals relevant to the regret and correct the regretted situation, consistent with a Lost Opportunity effect. Regret decreased over time, but less so if it concerned attainable ongoing goals, consistent with a Future Opportunity effect. These contrasting effects of future opportunity on initial severity and change over time support a new Dynamic Opportunity Principle of regret.

4. Opportunity Perceptions Determine the Intensity of Regrets That Arise From Maintaining Versus Changing the Status Quo.

Keith D. Markman, Figen Karadogan, and Hyeman Choi, Ohio University, USA

The present research addresses two critical questions in the regret literature. The first concerns the conditions under which people are more likely to regret their failures of action as opposed to their failures of inaction, and the second is whether people feel regret more intensely when future opportunities to take corrective action are available (Roese & Summerville, 2005) or when future opportunities have been foreclosed (Beike, Markman, & Karadogan, 2009). Employing the Monty Hall paradigm, the study examined the interactive effects of decision type (status quo maintenance vs. status quo change) and opportunity (repeatable vs. non-repeatable) on regret intensity. The results indicate that the influence of each variable on regret elicitation is significantly moderated by the influence of the other variable: Status quo maintenance under conditions of high future opportunity and status quo change under conditions of low future opportunity appear to be likely conditions for intensifying regret. Moreover, these effects appear to be moderated by individual differences in tendencies to consider future consequences. In all, the perception of foreclosed opportunities leads individuals to focus on actions they wish they had not have taken, possibly leading to more conservative decision-making in the future, whereas the perception of future opportunities leads individuals to focus on actions they wish they had taken, possibly leading to more risky decision-making in the future.

5. Universality and Cultural Variation in the Experience of Regret.

Seeger M. Breugelmans, Marcel Zeelenberg, Tilburg University, the Netherlands;

Thomas Gilovich, Cornell University, USA;

Wen-Hsien Huang, National Chung Hsing University, Taiwan, The Republic of China;

Yaniv Shani, Tel-Aviv University, Israel

Regret is the prototypical decision-related emotion. Most theory and research on regret comes from the USA and Europe, but recent research has suggested potential cross-cultural differences in regret. We examined universality and cultural variation in the experience of regret. A cross-cultural study compared experiences of regret with those of disappointment and guilt as reported by participants from the USA (n=143), the Netherlands (n =148), Israel (n =148), and Taiwan (n =115). We found strong evidence for universality of the distinct emotion components

of regret, compared to those of disappointment and guilt. We also found substantial cultural variation in the frequency and intensity of regret in intrapersonal situations (regrets about outcomes affecting the self) and interpersonal regrets (regrets about outcomes affecting others). Thus, the study provides evidence for both universal and culturally specific elements of regret.

Symposium XIII: What motivates donation decisions? New perspectives on the mechanisms underlying charitable giving Q-401

Chair: Stephan Dickert, Vienna University of Economics and Business, Austria

Discussant: Daniel Västfjäll

1. Individual differences and information acquisition in donation decisions: An eye-tracking analysis.

Janet Kleber, Sophie Süssenbach, Stephan Dickert, & Arnd Florack

Many non-profit organizations make use of donation requests to motivate people to give to charity. In these requests, the social causes that need financial support are typically illustrated by presenting different kinds of information such as verbal descriptions, numerical facts, and pictures. Previous research suggests that the general importance of these different kinds of information depends on individual differences in numerical ability. Particularly, people with lower numeracy are expected to be more susceptible to non-numeric information (e.g., descriptions), whereas higher numerate individuals should mainly base their decisions on numerical cues. This research project examines what information in donation requests is especially important to donors by considering donors' numerical skills (i.e., numeracy) as a potential moderator. We designed 12 donation requests varying the domain of the social cause (i.e., humanitarian aid, environment protection, animal protection) and the informational content of the pictures. Using eye-tracking technology, we assessed the information search patterns of participants that were asked to make real donation decisions for each of the donation requests. Behavioral results demonstrate that donation requests with more informative pictures receive higher donation amounts particularly in the domain of humanitarian aid and environmental protection. Moreover, analyses of participants' eye movements revealed that less numerate individuals tended to fixate more on the pictures and donated more with longer looking times, whereas people with higher numeracy donated less the longer they looked at the pictures. In addition to increasing the understanding of information

processing in less and high numerate individuals, this research also offers practical implications for the conception of donation requests.

2. Using agent based modeling to enhance charitable giving in a population.

Dorina Hysenbelli, Andrea Ceschi, Daniel Västfjäll, & Paul Slovic

In order to study the way helping behavior emerges within a population we simulate an agent-based model (ABM) based on four types of different virtual agents: Warm-Glow Cooperators (WG), Gratitude Cooperators (GC), Cooperators (C), and Defectors (D). Some specific variables determine the agents behavior. We explore the prosocial behavior of every type of agent and the system for a certain amount of time in different situations. 400 virtual agents are considered as WG (if they give because it makes them feel better), GC (if they give because they received help previously), C (if they give because of the both reasons mentioned above), and D (if they do not give at all). WG and C agents start with an initial potential to help; G agents start to move once they receive help from another agent. D agents never move because they are not motivated to help but they receive help. Four different types of scenarios are created in order to explore how the system behaves when the proportions of the agents are different. Giving and receiving levels of the whole system are higher when the number of D agents is lower compared to the other agents. When ratios are equal for the four different types of agents, C agents help 1.76 times more compared to WG agents and 2.15 times more compared to G agents; giving levels are about the same for all agent; helping levels are higher when the G agents have a lower ratio. If giving and receiving are both considered a positive activity, C agents are those who benefit more overall. If this is not true, C agents are those who "lose" more because they give more than every other agent, but they have the same probability as others to receive.

3. Understanding the developmental sources of scope insensitivity in helping behavior.

Tehila Kogut, Paul Slovic, & Daniel Västfjäll

The singularity effect of identifiable victims is described as the greater willingness to help a single, identified victim than to help a group of victims with the same need (whether identified or not). The current research examines the developmental sources of this phenomenon in early childhood. In two studies examining children's actual giving and level of Theory of Mind (ToM) from the ages of 3.8 to 8, we show that younger children tend to give more of their endowment

to a group of recipients than to a single recipient. However, this tendency reverses for older children (and those who have acquired ToM), who exhibit the singularity effect by giving more of their endowment to a single, identified target.

4. Donation Decisions: A Conflict Between Cost for the Donor and Benefit for the Recipients.

Enrico Rubaltelli & Paul Slovic

This study extends recent models of donation decisions by investigating donors inferences about the cost and benefit of contributing to charity organizations. In particular, in the first two experiments, we measured people's perception of how much the donation is a costs for them and beneficial for the receivers, whereas in the third experiment we manipulated both dimensions. In the first two experiments, we found that the cost-benefit dimension, in addition to affective reactions, predicts whether or not people will make a donation. We also found that affective reactions, but not the cost-benefit dimension, predicted donation amounts when participants were asked to make an open-ended contribution (e.g., willingness to pay). However, the cost-benefit dimension, but not affective reactions, predicted donation amounts when participants were asked to choose between fixed contributions, without the chance to modulate the cost they were facing. Finally, Experiment 3 compared conditions in which cost and benefit were either in conflict or not, and demonstrated the importance of testing these two variables together. The results are discussed in relation to recent psychological models of donation decisions and prosocial behavior and especially in relation to the two stage model of donation decisions (Dickert et al., 2011), recent results on the impact effect (Cryder et al., 2013) and research on the perception of costs in donation decisions (Rubaltelli & Agnoli, 2012).

5. How mental images and impact judgments influence charitable giving: The case of identifiability and magnitude effects.

Stephan Dickert, Janet Kleber, & Daniel Västfjäll

A defining feature of recent research on charitable giving is the specific focus on the affective and cognitive motivations underlying donation decisions. Two prominent findings on the valuation of human lives highlight the importance of the psychological mechanisms influencing charitable giving: (1) the identified victim effect and (2) the singularity effect. We argue that both phenomena can be understood by their specific affective and cognitive architecture. In two

studies we present evidence that mental imagery and perceived impact of a donation are mediated by affective motivators, and postulate a model that explains effects of victim identifiability and magnitude sensitivity. The results suggest that impact judgments can be explained with affective responses of the donors (i.e., regret) and that the underlying mechanisms of the identifiability effect are distinctly different from the effects of increasing the magnitude of the number of victims. The proposed model incorporates both explanations (i.e., perceived impact and affect) and shows under what conditions donation amounts are dependent on feelings and when they are dependent on more cognitive considerations (such as impact judgments).

Consumer JDM (III) Q-402

Chair: Liat Hadar

1. When Knowledge is Demotivating: Metacognitive Knowledge and Choice Overload.

Liat Hadar, IDC Herzliya (Israel)

People find more options to choose from more appealing, but the provision of choice often leads to adverse consequences on decision makers' motivation, satisfaction, and willingness to act. We propose that the effect of the number of choice options on willingness to purchase is moderated by people's metacognitive feeling of knowing (MK). The results of three studies provide converging evidence that, paradoxically, people who feel unknowledgeable (low MK) in a certain domain are especially willing to purchase when more choice options are available, consistent with the notion of "more is better". This pattern reverses for high MK people, consistent with choice overload. We also show that this pattern is influenced by the informativeness of the features of the available choice options and that MK mediates this effect.

2. Is it too many always too much? An exploratory study on group decision making and choice overload.

Nuno Jose Lopes, Elena Reutskaja, & Mario Capizzani, IESE Business School, University of Navarra (Spain)

A growing body of research has claimed that too many alternatives can negatively affect an individual's decision making process resulting in less choices and lower satisfaction with those choices (Iyengar & Lepper, 2000; Schwartz, 2000), a phenomena known as choice overload. These findings have been countered by other studies that conclude that the choice overload effect is not robust (Scheibehenne et. al., 2010). Despite the increasing attention to the phenomenon of choice overload, previous research has focused exclusively on individual decisions. Yet a considerable number of consumer purchase decisions are made jointly by groups or couples (Davis & Rigaux, 1974; Corfman & Lehmann, 1987; Jang et al. 2007). The phenomenon of choice overload in groups has not been explored. Therefore, the aim of this paper is to begin to fill this gap in the literature by comparing objective and subjective choice outcomes when either groups or individuals make choices from sets containing different number of options. In particular, we aim to experimentally compare the behaviour of these two types of subjects on purchase rates, units bought, and Euros spent as well as on subjective post-choice perceptions such as choice difficulty, enjoyment of the decision making. To do so we conducted a series of studies consisting of a pilot, a laboratory study, and a field experiment.

3. Temporal Discounting of Hedonic and Utilitarian Rewards: The Effect of Outcome Related Affect On Time-Sensitivity.

Selcuk Onay University of Waterloo (Canada)

Valeria Noguti University of Technology Sydney (Australia)

In this paper we examine the effect of the interaction between hedonic motives and time sensitivity on temporal discounting. We propose that people are less sensitive to time when outcomes are affect-rich (e.g., hedonic goods) than affect-poor (e.g., utilitarian goods) and, as a consequence, they discount affect-rich outcomes more hyperbolically than the outcomes that involve affect to a lesser extent such as utilitarian goods. In three studies in which we use a range of hedonic and utilitarian rewards and various preference elicitation methods, we find support for our hypotheses. We demonstrate that people are less sensitive to time when the

rewards are affect-rich. We also demonstrate that reward-related affect mediates the relationship between time insensitivity and reward category, either hedonic or utilitarian (study 1), a positive affect manipulation focused on outcomes reduces time sensitivity (studies 2 and 3), and cognitive ability moderates this relationship.

4. The Effect of Casual Structure on Preference for Products Offering Two Benefits versus a Single Benefit.

Kelly Saporta, The Open University of Israel

Shai Danziger, Recanati Graduate School of Business, Tel-Aviv University

Steven Sloman, Cognitive, Linguistic, & Psychological Sciences, Brown University, U.S.A

Imagine you have a cough and you rush to the pharmacy to treat it. You come across two drugs, one that claims to treat cough and fever and another that claims to treat only cough. In this research we explore peoples' relative preferences between the dual benefit and single benefit options. We utilize the causal reasoning framework to develop our predictions. We suggest a consumer's causal model regarding the cause of symptoms will determine their favored option. Specifically we predict consumers will prefer the single-benefit option when they believe different causes produce the symptoms (different causes model), but will prefer the dual-benefit option when they believe the same cause produces the two symptoms (same cause model). This prediction is based on causal model theory's implication that symptoms with a common cause must correlate while symptoms with different causes are not expected to covary. In addition, findings indicating cause-effect congruency lead us to postulate that if consumers believe a single cause produces the two symptoms, they will likely believe that a single drug can treat both. Therefore, if we have a symptom and are offered a drug that treats it and another symptom that we believe results from the same cause, we will infer the symptoms are correlated and that the same drug will effectively treat both. Results of four studies confirm our predictions.

5. Scale and metric design as choice architecture tools.

Adrian R. Camilleri Duke University (United States)

*& Richard P. Larrick**

In recent years, there is a growing interest in using behavioral decision insights to design better "choice architecture" for decision makers. One specific target for this policy is a reduction in CO₂ emissions from transport-related fossil fuel combustion. In two experiments the authors examined whether preferences could be nudged toward more fuel-efficient vehicles by manipulating the metric and scale upon which fuel economy information was presented. The authors found that decision-maker's tendency to prefer more fuel efficient vehicles was strongest when fuel economy was expressed (1) in terms of the "cost of gas" rather than the "gallons of gas" used, and (2) in terms of an expanded, lifetime time scale ("per 100,000") rather than smaller scales ("per 100 miles", "per 15,000 miles"). Based on these results, the authors suggest that policy-makers should initiate programs that communicate fuel efficiency information in terms of costs and over a lifetime scales.

2.15pm–4.15pm

"Early Career Networking Event" Q-101

Coordinator: Jon Jachimowicz

Where do you see JDM as a field going on the future and how can young researchers best be a part of that?"

Panelists Colin Camerer, Peter Ayton, Barbara Summers and Marcel Zeelenberg

			Thursday, 22nd			
9.00am-10.00am	KEYNOTE ADDRESS IV: Improving judgments through sequentially simulated outcomes. Robin Hogarth, Universitat Pompeu Fabra, Spain					
	Aula Magna					
10.00am-10.30am	Coffee Break					
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401
10.30am-12.30pm	Modelling	Individual Differences in JDM (II)	Risk and Loss Aversion(II)	Medical Clinical JDM (I)	Heuristics (I)	Symposium XIV: Honest lies? Cognitive process investigation of unethical judgment and behavior
	Chair: Wolfgang Wiedermann	Chair: Renato Frey	Chair: Stefan Zeisberger	Chair: Liesbeth Claassen	Chair: Sibilla Di Guida	Chair: Shaul Shalvi Discussant: Ilana Ritov
	Drug harm perception and cognitive accessibility of perceived substance use: A preference model for multivariate ranking data. Wolfgang Wiedermann, Reinhold Hatzinger, & Ulrich	Aging, learning, and experience-based risky choice. Renato Frey, Rui Mata, & Ralph Hertwig	How important is the probability of loss in investment decisions? Stefan Zeisberger	Cancer worry and screenings decisions in women with a family history of breast cancer. Liesbeth Claassen	An Eye-tracking Study of Feature-based Choice in One-shot Games. Sibilla Di Guida, Giovanna Devetag, & Luca Polonio	Strategic dishonest behavior in monetary donations to social organizations. Shahar Ayal, Guy Hochman, Uri Gneezy, & Dan Ariely
	Evaluating Cognitive Models of Choice: (When) Does Hierarchical Bayesian Estimation Pay Off? Benjamin Scheibehenne & Thorsten Pachur	Social Desirability and Decision-Making: Social Image or Social Sensitivity? Piers Fleming	Loss Aversion for Time and Money. Craig R. Fox	Influence of disease prevalence and an alternative explanation on physicians' detection of early cancers. Olga Kostopoulou, Miroslav Sirota, Shyamalee Samaranayaka, & Thomas Round	Children's choices: (How) do decision strategies develop with age?. Stefanie Lindow & Tilmann Betsch	How intentions and deception influence attributions of responsibility in groups. Tobias Gerstenberg, Simeon Schächtele, David Lagnado, & Yaakov Kareev
	Model comparisons using tournaments: Likes, "dislikes", and challenges. Leonidas Spiliopoulos	Level of Interoceptive Awareness Moderates the Impact of Negative Utility on Probability Judgments. Laura de Molière, & Adam J.L. Harris	Prospect theory and health-promotion: personal involvement predicts framing-effects on the decision to engage in a risky health behavior. Lucia Bosone & Frédéric Martinez	Information distortion in medical diagnosis: A consider-the-opposite strategy for debiasing judgments. Martine Nurek, Olga Kostopoulou, York Hagmayer, & Patrick	Developmental differences in children's use of simple heuristics: The case of the recognition heuristic. Rüdiger F. Pohl	Lies that feel honest – an fMRI investigation. Gert-Jan Lelieveld, Eveline A. Crone, & Shaul Shalvi
	How irrelevant information influences people's probability judgments and belief updates: A cognitive modeling study. Mirjam Annina Jenny, Jörg Rieskamp, & Håkan Nilsson	Mastering complexity: Age trends in the ability to make increasingly complex decision in young school children. Johannes O. Ritter	Prospect theory in the health domain: A quantitative assessment. Arthur Attema, Werner Brouwer, & Olivier l'Haridon	Perceived coerciveness of rewards for medical treatment. Marianne Promberger, Marijke Van Putten, & Theresa M Marteau	What's next? Disentangling availability from representativeness. João Braga, Mário B. Ferreira, Steven J. Sherman	Personality and Situational Factors Influencing Cheating Behavior. Andreas Glöckner & Guy Hochman
	Parameter Recovery for Decision Modeling Using Choice Data. Stephen Broomell & Sudeep Bhatia	Predicting behavior in a Solidarity Game by Justice Sensitivity – who cares to share, and who doesn't? Thomas M. Schlösser & Olga Stavrova	Risky Choice in the Limelight. Martijn van den Assem	Should patient narratives be used to support people's treatment decision making: an experimental study about dialysis options? Hilary		Moral Firmness. Shaul Shalvi & David Leiser
	Serial integration biases and the adaptive gain model. Samuel W. Cheadle	Expectancy: The Missing Link in Gender Difference in Risk Aversion. Rakesh Sarin & Alice Wieland	How Dependencies Between Choice Outcomes Affect Decisions Under Risk. Sandra Andraszewicz	Recognizing Complexity: "A Prerequisite for Skilled Intuitive Judgments and Dynamic Decisions". Anders Jansson		
12.30pm-1.30pm	Lunch					

			Thursday, 22nd			
TIME/ROOM	Q-101	Q-102	Q-103	Q-301	Q-302	Q-401
1.30pm-3.00pm	Symposium XV: Perspectives on the Current Crisis in Psychological Science: What It Is and Where It Should (and Should Not) Be Going	Individual Differences in JDM (III)	Risk and Loss Aversion (III)	Medical Clinical JDM (II)	Heuristics (II)	Neural Processes
	Chairs and Discussants: Barbara Spellman & Klaus Fiedler	Chair: Gilly Koritzky	Chair: Olivier I'Haridon	Chair: Michelle E. McDowell	Chair: Florian Artinger	Chair: X. T. Wang
	Precursors of the Perspectives on Psychological Science journal and current editorial situation of the field. Barbara Spellman	Predicting success in weight-management based on decision-making style. Gilly Koritzky, Camille Dieterle, Chantelle Rice, Jordan Katie, & Antoine Bechara	Source-dependence of utility and loss aversion: A critical test of ambiguity models. Olivier I'Haridon	Understanding prostate cancer screening behavior: Family history, cognitive heuristics, and perceptions of risk. Michelle E. McDowell	Pricing in the Face of Uncertainty – Simple Strategies in a Complex Environment. Florian Artinger	A Meta-Analysis of Framing Effects: Behavioral Dynamics and Neural Correlates. X. T. Wang & Li-Lin Rao
	Missteps in the current wave of reform: the call for exact replications as a potential quashing for new investigations. Klaus Fiedler	Retributive and compensatory reactions to injustice under time pressure and time delay: the effect of Justice Sensitivity. Olga Stavrova & Thomas Schlösser	Group decision rules and group rationality under risk. Aurélien Baillon, Ning Liu, Han Bleichrodt, & Peter Wakker	Using emotions conveyed by patient narratives: Comparing reassurance- and regret-based stories in colorectal cancer screening. Teresa Gavaruzzi, Michela Sarlo, Francesca Giandomenico, Francesca Polato, Franca De Lazzari, Rino Rumiati, & Lorella Lotto	Pseudo Diversification in the Stock Market: The Role of Perceived Diversity in Judgments of Investment Portfolios. Shahar Ayal, Assaf Amit Amit, David Disatnik, & Dan Zakay	Losses amplify the role of frontal asymmetry predispositions. Eldad Yechiam & Ariel Telpaz
		How episodic and working memory affect rule- and memory-based judgments. Janina Anna Hoffmann, Bettina von Helversen, & Jörg Rieskamp	Third-party decision-making under risk. Annabel Losecaat Vermeer & Alan Sanfey	When 1% Chance for Me \neq 1% Chance for You: Self-other Discrepancies in Probability Weighting in Decisions about Health. Dafina Petrova, Rocio Garcia-Retamero, & Joop van der Pligt		The brain represents value by rank order within a distributed network of varying context dependency. Timothy L. Mullett
		The motivational nature of causal illusions. José César Perales, Juan Francisco Navas, Ana Torres, Andrés Catena, & Antonio Maldonado	Will you still feed me? The ratio bias vs construal level theory revisited in different risk domains. Volker Thoma	Reconsidering an initial diagnosis: the role of conflicting information and meta-cognitive feelings of rightness. Amanda Woolley & Olga Kostopoulou		

Thursday 22nd

Parallel Sessions

10.30am–12.30pm

Modelling Q-101

Chair: Wolfgang Wiedermann

1. Drug harm perception and cognitive accessibility of perceived substance use: A preference model for multivariate ranking data.

Wolfgang Wiedermann, Department of Psychology, University of Vienna (Austria)

Reinhold Hatzinger, & Ulrich Frick

Systems to classify substances for legislative purposes often lack scientific evidence. Recent efforts to derive evidence-based drug harm ratings focused on experts' views and lay perspectives (i.e. surveys among former users or the general public). Methodologically, previous assessments have in common that experts/laypersons assign drug-specific 'preference scores' to various harm dimensions (e.g. using a 0 = 'no risk' to 3 = 'high risk' scale). Averaging these scores across dimensions then is regarded to reflect the overall harm of a substance. However, this approach assumes that the judgments can be interpreted at least on an interval measurement level. More sophisticated approaches estimate cardinal values from preference tasks such as paired comparisons or rankings. The current study introduces a preference model which allows the estimation of cardinal values from multivariate ranking data. The model accounts for the complexity underlying multiple rankings (i.e. ranking drugs with respect to several dimensions) and incorporates the correlational structure among judgments. From a social judgment perspective, the study further highlights the role of information on drug harm retrieved at the moment of judging and presents an application of the new model to demonstrate a context-dependent trivialization effect of perceived substances' harm among the general public.

2. Evaluating Cognitive Models of Choice: (When) Does Hierarchical Bayesian Estimation Pay Off?

Benjamin Scheibehenne University of Basel, (Switzerland)

Thorsten Pachur Max Planck Institute for Human Development, Berlin (Germany)

An important criterion for evaluating cognitive models of choice is to what extent they capture consistent characteristics of an individual, measured by the models' adjustable parameters. However, conclusions regarding parameter consistency (or reliability) may also depend on the estimation method used to fit the parameters. Recently, hierarchical Bayesian methods have been proposed as an alternative to conventional estimation techniques (e.g., Nilsson, Rieskamp, & Wagenmakers, 2011; Scheibehenne, Rieskamp, & Wagenmakers, 2013) because they exploit group level distributions to inform individual parameter estimates which supposedly yields more reliable estimates. Based on experimental data by Glöckner and Pachur (2012), we apply both hierarchical and non-hierarchical Bayesian techniques to estimate and compare two prominent models of risky choice, cumulative prospect theory (CPT; Tversky & Kahneman, 1992) and the transfer-of-attention-exchange model (TAX; Birnbaum & Chavez, 1997) in terms of their parameter stability. Parameter stability is assessed by contrasting parameter values estimated for each individual decision maker at two separate time points and by evaluating the performance of both models in out of sample predictions (i.e., when the goal is to predict decisions of a new, previously unobserved individual). Surprisingly, we find that for both TAX and CPT parameter stability is not improved by using hierarchical Bayesian as compared to a non-hierarchical approaches. Further analyses suggest that this is because the hierarchical estimation overcorrects for extreme yet reliable parameter values. We suggest that the benefits of hierarchical techniques may be limited to particular conditions, such as sparse data on the individual level or very homogenous samples.

3. Model comparisons using tournaments: Likes, "dislikes", and challenges.

Leonidas Spiliopoulos and Andreas Ortmann

Australian School of Business, University of New South Wales

We examine the value added of tournaments that compare the predictive power of behavioral models. The term tournament is, in the present context, defined as a study where author(s) solicit mathematical models or coded programs from third parties to participate in a

competition with explicit rules and goals. The advantages and disadvantages of this particular method have not been systematically discussed in the literature; here we aspire to do so. We first define a taxonomy of tournaments and briefly discuss how existing tournament studies fit into our taxonomy. We then proceed by discussing the tournament method's merits, identifying desiderata regarding implementation, and also some important caveats. A recurrent theme in our analysis is the Duhem-Quine problem that states that any hypothesis test is a joint test of the hypothesis in question and all auxiliary hypotheses and parameterizations. We argue that serious consideration must be given to the dependence of tournament conclusions on the auxiliary hypotheses. Throughout the paper we propose solutions to overcome some of the limitations of tournaments, supplementing our analysis with practical examples using the Ert et al. (2011) tournament data. Our proposals cover both the implementation and design of the experimental component of tournaments, and the subsequent analytic techniques applied to the resultant data. We conclude that tournaments are a useful addition to our arsenal of methods and a significant step forward in the study of the predictive power of behavioral models. Such tournaments are not without limitations though and we identify, and illustrate, current limitations, propose solutions to overcome some of them, and identify a research agenda to address the remaining.

4. How irrelevant information influences people's probability judgments and belief updates: A cognitive modeling study.

Mirjam Annina Jenny, Max Planck Institute for Human Development (Germany)

Jörg Rieskamp, University of Basel (Switzerland)

Håkan Nilsson, Uppsala University (Sweden)

When people revise their beliefs on the basis of new information, they often take irrelevant information into account. Although this "dilution effect", according to which non-diagnostic information "dilutes" probability judgments downwards, has been found in many domains, few studies have modeled the underlying cognitive processes. To explain the dilution effect we suggest a "similarity-updating model", which incorporates a similarity judgment process (inspired by similarity models from categorization research) and a weighting and adding process (inspired by probability assessment and belief-updating models from judgment research). We show that this model describes people's probability judgments and belief revisions well. In three experiments participants received samples from one of two card decks and had to judge from which deck the samples originated. The similarity-updating model predicts that this probability

judgment is a function of the relative similarity of the sample to both decks. When presented with a new sample, the previous probability judgment is updated with a second probability judgment by taking a weighted average of the two. The model describes people's probability judgments well and outperforms a Bayesian model and nine further models of belief revision. Furthermore, the weighting and adding process in the similarity-updating model implies the dilution effect. Simulations show that the model predicts a realistic amount of trials with a dilution effect. However, the simulations also show that the model often produces adaptive judgments—especially when presented with moderate to large samples. In sum, the similarity-updating model provides a valid and adaptive account of human probability judgment and belief revision.

5. Parameter Recovery for Decision Modeling Using Choice Data.

Stephen Broomell & Sudeep Bhatia *Carnegie Mellon University (United States)*

Building on research in information theory and adaptive design optimization, we develop a computational framework for applying Kullback-Leibler divergence to quantify the effectiveness of a set of decision problems for recovering choice model parameters (such as for Cumulative Prospect Theory). This method can be applied to analyze the properties of previously used decision sets and for developing new decision sets without responses from a decision maker. The approach is important for evaluating the effectiveness of choice data for parameter estimation, a problem that has received little attention. We demonstrate the computational approach on three recent experimental decision sets designed for estimating cumulative prospect theory parameters from choice data, and we show large differences in ability to recover parameters.

Our method produces several new results for decision modeling. First, we identify a measure that compares the effectiveness of decision sets for parameter recovery. Second, the application of our measure to the description-experience gap reveals the statistical impact of experiences on parameter recovery from choice data, showing that small experiences of currently used decision problems provide little (if any) information for estimating the shape of the weighting function. Finally, our analyses indicate that currently used decision problem sets have less information to estimate the shape of the decision weighting function compared to the shape of the value function. Overall, the application of the proposed method could vastly improve the efficiency of decision sets to achieve research goals and can be considered as similar to reporting effect sizes and power analyses in psychological research.

6. Serial integration biases and the adaptive gain model.

Samuel Cheadle¹, Konstantinos Tsetsos, Christopher Summerfield, University of Oxford

When judgments are made on the basis of multiple independent samples of evidence, humans often deviate from optimality. Using a serial integration task we investigated the nature of these biases and propose a biologically inspired adaptive gain model to account for them. Observers indicated whether the tilts of a series of visual gratings fell closer to the cardinal axes (0° and 90°) or diagonal axes (45° and -45°). Regression analysis identified three separate biases: Firstly, samples of evidence that were perceptually similar to their predecessor carried more weight in the eventual choice (commensurability bias). Secondly, samples of evidence that confirmed, rather than disconfirmed, the current belief of the observer were more influential in the choice (confirmation bias). Thirdly, observers overweighted evidence that arrived closer in time to the decision (recency bias). The observed behavioural biases can be accounted for by a simple integration model in which (1) neuronal tuning is sharpest near the centre of the decision space, and (2) the point of maximum gain adapts to the local statistics of stimulation. The results are consistent with a dynamic representation of current beliefs, encoded implicitly in the neural tuning function. This explanation does not rely on additional integration stages in which the momentary evidence is evaluated, and is consistent with the rapid influence (<250ms) of prior evidence on future sampling.

Individual Differences in JDM (II) Q-102

Chair: Renato Frey

1. Aging, learning, and experience-based risky choice.

Renato Frey, Rui Mata, & Ralph Hertwig, Max Planck Institute for Human Development; Center for Adaptive Rationality (ARC)

In many domains of life, people need to learn about choice options through exploration. That is, they often make decisions from experience in contrast to decisions from description, where choice options are fully described and no learning is required. Previous research suggested that in some experience-based tasks of risky choice, older as compared to younger adults differ in their propensity to take risks, with one possible reason being attenuated learning abilities in older adults. We investigated whether this finding extends to choice behavior in a sampling

paradigm, where participants freely explore two choice options before making a consequential choice. In Study 1 (N=121), younger and older adults rendered 12 decisions from experience in the laboratory. The two age groups differed substantially in fluid cognitive abilities. However, we did not find any age differences regarding exploration nor choice. To investigate the underlying learning processes and to test the robustness of this finding, we ran Study 2 (N=70) in which we asked younger and older adults to render 84 decisions from experience over the course of a week (using tablet computers). Again, the two age groups differed substantially in fluid cognitive abilities, but we only found small differences in exploration and no differences in choice. Cognitive modeling of the learning processes revealed a possible reason for this finding: For both younger and older adults, a simple value-updating model explained choices best. That is, aging does not seem to prevent the successful exploitation of a sequential outcome nature. We conclude that both younger and older adults may achieve a similar choice performance in tasks where they can rely on a simple updating strategy.

2. Social Desirability and Decision-Making: Social Image or Social Sensitivity?

Authors: Piers Fleming, University of East Anglia; Daniel John Zizzo, University of East Anglia

What is the relationship between social desirability and decision making? The traditional 'image' account is that social desirability is a trait measure of externally-focused positive self-presentation. This account primarily explains self-report data and cheap talk but not unobserved behavior. It implies that social desirability masks true preferences. An alternative account is a locally-focused sensitivity to the current social context irrespective of positive image. Both accounts typically produce similar predictions but we contrast them by manipulating implied positive image across similar tasks. In two experiments participants' willingness to share and destroy money were tested in dictator-type games. In study 1 high social desirability participants were more willing than those low in social desirability to give their money to a computer. In study 2 participants were given an unambiguous task with a clearly non-productive outcome. Participants high in social desirability were more willing to shred their coupons (valued at 50p each) but not to give to the experimenters, when told that others had done so. In both cases we find that social desirability has behavioral effects which are explained by willingness to respond to contextual cues such as experimental demands and descriptive norms (social sensitivity). These effects weren't explained by self-presentational benefit (social image) which might predict greater giving to others.

3. Level of Interoceptive Awareness Moderates the Impact of Negative Utility on Probability Judgments.

Laura de Molière, & Adam J.L. Harris, University College London (United Kingdom)

Decision Theory assumes independence of utility and probability. However, recent research has identified a bias to overestimate the likelihood of events with negative compared to neutral utility. Vosgerau (2010) proposed that arousal elicited by valenced events signals that there is something at stake; and misattribution of this arousal leads to inflated probability judgments for emotive outcomes ("stake likelihood hypothesis"). Affective experiences have been shown to be influenced by the extent to which individuals are interoceptively aware. Interoceptive awareness (IA), the ability to sense changes in one's body, amplifies the intensity with which individuals experience arousal arising from emotive stimuli, and thus serves as a potential moderator for the impact of utility on probability. In an online study, participants completed four measures of IA and estimated the likelihood of either two neutral, or two negative outcomes. Only participants high in IA showed an increase in likelihood estimates for negative compared to neutral events. These results are important for three reasons: they replicate earlier research demonstrating a negativity bias, highlight a previously unidentified individual differences variable in probability judgments and, finally, give support for the stake likelihood hypothesis.

4. Mastering complexity: Age trends in the ability to make increasingly complex decision in young school children.

Johannes O. Ritter, University of Erfurt Nordhäuserstr (Germany)

When and how children develop competence in decision making is an important question both from the practical and the theoretical perspective. From the practical level, questions arise as to at what age children should be entitled to make what kinds of decisions. From the theoretical, developmental trajectories inform theoretical assumptions. The aim of this study is to investigate the development in the capacity to master complex decision environments providing probabilistic information.

5. Predicting behavior in a Solidarity Game by Justice Sensitivity – who cares to share, and who doesn't?

Thomas M. Schlösser & Olga Stavrova, University of Cologne (Germany)

It has been repeatedly shown that individual differences in the four facets (victim, perpetrator, observer, beneficiary) of Sensitivity for (In)justice (JS) are able to substantially predict pro- and antisocial behavior in very different social dilemmas based on reliable individual level predictive quality. We show that JS is also related to solidary behavior in the so called solidarity game ("Authors", 2011). We transferred their original design and administered JS scales to our participants online a month in advance before the actual experiment. Participants (N=55) were randomly drawn to anonymous groups of three and asked to roll a die once to eventually win €5 with a chance of 2/3. Before dicing, they indicated if and how much of their eventual gain they would share with losing group members. Results show that participants scoring high on JS from the victim's perspective are less solidary ($r \approx -.30$), whereas those sensitive for injustice in the perpetrator's role are more likely to share ($r = .30$). These effects were robust against controlling for age, gender, and the beliefs about whether other group-members would share and were mediated via moral emotions. In a laboratory study (N=96) we allowed the losing participants to take away winner's money. The amount taken away significantly correlated with JS as expected. In a partly modified replication study (N>100), we asked the question if participants use features of the procedure (i.e. the random character of throwing dice) as an implicit excuse for egoistic or competitive behavior contingent on their JS – and so they do. Further potential applications of Justice Sensitivity in the field of experimental social dilemmas and its relationship to "stable preferences" will be discussed.

6. Expectancy: The Missing link in Gender Difference in Risk Aversion.

Rakesh Sarin, UCLA Anderson School of Management, University of California, Los Angeles, CA (United States)

Alice Wieland, University of Nevada, Reno (United States)

It has become well-accepted that women are more risk averse than men. This research investigates the role of subjective expectancy or personal probability of success and failure in gender differences in risk aversion. For games of chance, typically used in eliciting risk aversion, we find women generally have a lower valuation (selling price or certainty equivalent) than men,

thus exhibiting greater risk aversion. However, for tasks where one must rely on one's own internal subjective expectancies of the probabilities of outcomes – the kind of decisions that dominate our day-to-day decision-making – we find no evidence of gender differences in risk aversion. Further, even for games of chance when subjective expectancies are included in the regression model, there are no significant gender differences in risk aversion.

Risk and Loss Aversion (II) Q-103

Chair: Stefan Zeisberger

1. How important is the probability of loss in investment decisions?

Stefan Zeisberger, University of Zurich (Switzerland)

We hypothesize that for repeated investments decision makers are not only averse to losses but in addition are averse to the overall probability of a loss. We test our hypothesis in a series of experiments in which subjects can invest in a risky asset. We find that subjects invest significantly lower amounts if the risky asset possesses a high overall probability of a loss, even if the asset is otherwise relatively attractive. Our results are virtually independent of decision makers' preference parameters for contemporary decision theories, including high degrees of loss aversion.

2. Loss Aversion for Time and Money.

Craig R. Fox, UCLA Anderson School of Management (United States)

We demonstrate that time preferences as measured using standard discount-delay tasks reflect not only sensitivity to time but also sensitivity to monetary losses. First, when people choose between a smaller-sooner and a larger-later amount of money, they appear to adopt the larger amount as the reference point and view the difference between the larger and smaller amounts as a loss. Thus, people who are more loss averse are more reluctant to give up money to receive a payment sooner and therefore appear more patient. We show that loss aversion is positively related to patience across a number of time preference and loss aversion measures. Second, we find the impact of individual differences in monetary loss aversion on time discounting is greater when explicitly framing the larger-later amount as the reference option than when

framing the smaller-sooner amount as the reference option. We also find that the difference in measured time preference between frames increases with a person's degree of monetary loss aversion. Third, we introduce a measure of loss aversion for time in which people choose between receiving a fixed amount of money at a reference point in time, t_r or accepting a 50-50 chance of accelerating to a sooner point, t_s , or delaying to later point t_l . People are averse to losing time, such that they require a greater acceleration ($t_r - t_s$) than delay ($t_l - t_r$) in order to accept the 50-50 option. We validate this ratio as a measure of both time preference and loss aversion by showing a significant correlation with both discount rates and monetary loss aversion.

3. Prospect theory and health-promotion: personal involvement predicts framing-effects on the decision to engage in a risky health behavior.

Lucia Bosone and Frédéric Martinez GRePS (Research Group in Social Psychology), Université Lumière Lyon

Main research applying prospect theory to the domain of health-promotion demonstrated that message-framing has a direct effect on the attitudes towards, and the intention to adopt, different health-behaviors, such as mammography, HIV testing, sunscreen use, STDs prevention (see Rothman et al, 2003, 2007). In this domain, framing-effects depend on individuals' perception of the risks of engaging (or not engaging) in a target behavior. More precisely, loss-framed promotional messages are the most persuasive promoting detection behaviors (e.g. mammography), as they present the risks of discovering a disease, whereas gain-framed messages are the most effective in promotion diseases-prevention behaviors (e.g. sunscreen use). However, several studies demonstrated that framing-effects depend on whether individuals are concerned by the addressed health issue (Meyers-Levy & Maheswaran, 2004). The two experimental studies we carried out aim to test whether framing-effects on decision-making processes depend on individuals' involvement in the situation, and to analyze the possible reasons why highly-concerned individuals are the most affected by message framing. We will demonstrate how personal involvement (i.e. personal relevance) depends on perceived vulnerability to a health threat, determining the framing effects on behavioral intentions to adopt either a disease prevention behavior (i.e. participating to a clinical trial; study 1) or a disease detection behavior (i.e. cholesterol screening test; study 2). These results, discussed from the perspective of the protection motivation model (Rogers, 1983) and the elaboration likelihood model (Petty & Cacioppo, 1979), present interesting insights on the mechanisms predicting framing effects on decision-making processes.

4. Prospect theory in the health domain: A quantitative assessment.

Arthur Attema, Werner Brouwer, Erasmus University Rotterdam, (Netherlands)

Olivier l'Haridon, Crem-University Rennes (France)

It is increasingly being acknowledged that expected utility (EU) theory has substantial empirical deficiencies. Prospect theory has developed as an important alternative, with more descriptive validity. Several applications of prospect theory have recently been performed in the health domain, but to date no quantification of prospect theory's full function had been performed in this domain. This paper is the first to do so.

5. Risky Choice in the Limelight.

Martijn van den Assem, Guido Baltussen & Dennie van Dolder, Erasmus School of Economics (Netherlands)

We examine how risk behavior in the limelight differs from that in the anonymity of a typical behavioral laboratory. We perform two experiments, and in both we find that participants are more risk averse in the limelight. However, risky choices are similarly path dependent in the different conditions. Under both limelight and laboratory conditions, a simple prospect theory model with a path-dependent reference point provides a better explanation for participants' behavior than a flexible specification of expected utility of wealth theory.

6. How Dependencies Between Choice Outcomes Affect Decisions Under Risk.

Sandra Andraszewicz, Basel University (Switzerland)

Standard economic theory of decision making assumes that people evaluate options independently of each other. However, recent cognitive models of decision making, suggests that people evaluate options by comparing the options' potential consequences with each other. Therefore, these cognitive models predict that the subjective value of an option always depends on the choice set. To test these contrasting predictions of economic theory and cognitive decision models, we examined pairs of monetary gambles where the outcomes depended on an external event and therefore covaried with each other. When people compare the options' outcomes with each other then the larger the covariance the easier the decision should be. We

tested this prediction by letting people choose between gambles with fixed expected value differences but with different covariance structures. As predicted, the observed choice probabilities were substantially influenced by the covariance structure. These results illustrate, that interdependent evaluations of options represents a fundamental cognitive mechanisms underlying human decision making.

Medical Clinical JDM (I) Q-301

Chair: Liesbeth Claassen

1. Cancer worry and screenings decisions in women with a family history of breast cancer.

Liesbeth Claassena, Lidewij Hennemana,d, Jan C. Oosterwijkb, Christi J. van Asperenc, Fred H. Menkod, Caroline F. Ockhuysen-Vermeya, Piet J. Kostensee, , Daniëlle R.M. Timmermansa*

A Department of Public and Occupational Health, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, The Netherlands,

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The aim this study was to examine the role of cancer worry for screenings decisions in women with a family history of breast cancer. We present data from a longitudinal multicenter study among 386 unaffected women with a breast cancer family history who were referred to the clinical genetics for risk consultation. During counseling, risk was communicated as a risk category: population or slightly increased risk (10%-20%), moderately increased risk (20-30%) or increased risk (30-40%). Participants filled out a questionnaire before, and at two weeks and 6 months after the consultation. Outcome measures included breast cancer risk perception (in %), cancer worry, intentions regarding cancer surveillance and self-reported surveillance behaviour (breast examination by a physician, and mammography). Before counselling, risk perceptions, surveillance intentions and cancer worry were relatively high. After counselling, risk

perceptions dropped to realistic levels. Cancer worry decreased, except in the highest risk category. Intentions to undergo breast examination by a physician and to undergo a mammography decreased. At 6 months, self-reported surveillance behaviour did not differ between risk categories. The latter finding suggests a tendency for overscreening in women with population or slightly increased risk. We also found that neither surveillance intentions at baseline nor counselled risk category predicted screening behaviours at 6 months. Notably, while risk perception at two weeks after counselling did not predict screening behaviour, cancer worry at two weeks did. We conclude that although risk counselling seems effective in reducing overestimation of breast cancer risk it does not reduce overscreening in women with population or slightly increased risk. Our findings show that cancer worry is a more important factor in the decision to undergo screening than counselled risk and risk perception. To prevent overscreening, we propose that counselors specifically address cancer worry in their communications in women with population or slightly increased risk.

2. Influence of disease prevalence and an alternative explanation on physicians' detection of early cancers.

Olga Kostopoulou, Miroslav Sirota, Shyamalee Samaranayaka, Thomas Round, King's College London, Department of Primary Care and Public Health Sciences, School of Medicine

Presenting author: Olga Kostopoulou

Early detection of cancer is crucial for the successful management of the disease. As part of the National Awareness and Early Diagnosis Initiative (NAEDI) in the UK, we are investigating why general practitioners (GPs) might miss early presentations of cancer. In this study, we tested the influence of two factors: cancer prevalence and the availability of an alternative explanation for the patient's symptoms

3. Information distortion in medical diagnosis: A consider-the-opposite strategy for debiasing judgments.

Authors: Martine Nurek, Dr. Olga Kostopoulou, Dr. York Hagmayer, Dr. Patrick White

Affiliation for all authors: King's College London (Department of Primary Care & Public Health Sciences, School of Medicine)

Presenting author: Martine Nurek

Theories of cognitive consistency posit an inherent, non-conscious drive to formulate and maintain coherent judgments. Reasoning is considered bidirectional: components of the reasoning process feed into conclusions, but emerging conclusions in turn shape the search for and interpretation of information. One example is predecisional information distortion (ID), where evaluations of incoming information are altered to support an emerging decision.

Predecisional ID has been found in lay people and professional groups (salespersons and auditors). In medical diagnosis, General Practitioners (GPs) were found to alter the diagnostic value of incoming information to support their leading diagnosis. The higher their estimated likelihood of the leading diagnosis, the larger was the distortion.

In keeping with sequential evolution of preference – a process tracing method used to study predecisional ID⁶ – GPs evaluated cues in sequence, indicating the extent to which each supported one of two possible diagnoses. Ratings were cast along a 21-point scale: a rating at either end indicated strong support for one of the two diagnoses and a rating in the middle indicated no support for either. GPs could thus evaluate the diagnosticity of a cue in relation to one diagnosis. However, they were not able to express, nor encouraged to consider, that a cue might support both options.

The present study employed separate scales for cue evaluation: one for each diagnosis. This allowed us to 1) differentiate and compare predecisional ID with respect to leading and trailing diagnoses and 2) explore the potentially corrective effects of concurrently considering the opposite – a debiasing technique yet to be assessed in this context.

4. Perceived coerciveness of rewards for medical treatment.

Marianne Promberger & Theresa M Marteau, King's College London; Marijke Van Putten, Leiden University (Netherlands)

Offering financial rewards for medical treatment such as vaccination might improve health outcomes. Such rewards are controversial, and a frequently raised concern in the ethical and public debate is that they might be coercive. Are specific offers of rewards for medical treatment really perceived to be coercive, and how are these perceptions were influenced by size of the reward, by presence and type of side effects, and predicted regret after a bad outcome? We also addressed whether perceived coerciveness was associated with acceptability of the reward, and whether others are seen as more susceptible to rewards than oneself.

5. Should patient narratives be used to support people's treatment decision making: an experimental study about dialysis options?

Hilary Bekker, Leeds Institute of Health Sciences School of Medicine University of Leeds (United Kingdom)

Background: Patient decision aids help people make informed treatment decisions. Some argue adding patient stories enhances the effectiveness of patient decision aids. Prior work suggests narratives bias people's decisions. It is unclear if this effect can be ameliorated.

Aim: To test whether adding patient stories about the decision making process and/or outcome to the Yorkshire Dialysis Decision Aid (YoDDA) affects people's choices about haemodialysis (HD) or peritoneal dialysis (PD).

Method: An experimental, online study. UK University staff and students consenting to participate were randomised by the website to one of seven conditions: YoDDA; YoDDA + process narrative; YoDDA + outcome narrative (PD / HD); YoDDA + process and outcome narrative (PD / HD); YoDDA + process and outcome narratives (HD) + value clarification task. Participants completed measures assessing: (hypothetical) choice; decisional conflict; knowledge; risk perceptions and values. The programme traced web-site utilisation.

Results: 541 people from 30 Universities took part. In the YoDDA group, 63% chose HD, 37% PD. YoDDA+ process narratives, no effect; YoDDA + outcome narrative, 10% change for PD and 20% change for HD; YoDDA + process + outcome narrative, 20% change for PD and 24% change HD; YoDDA + process + outcome narrative + value clarification task, same effect as without task.

Knowledge lower in narrative groups, mixed feelings higher and value-choice consistency lower. Conclusions: Adding stories to a decision aid discourages people from making informed decisions. The effect is augmented when both decision process and outcome narratives are used. They are not ameliorated by providing decision aid information and/or tasks to help people focus on their own values.

6. Recognizing Complexity: "A Prerequisite for Skilled Intuitive Judgments and Dynamic Decisions".

Anders Jansson, Uppsala University Dept. of Information Technology Div. of Visualization Information & Interaction (Sweden)

There are two main approaches to intuition and expertise within the decision-making literature: heuristics and biases (HB) and naturalistic decision making (NDM). They often come to different conclusions regarding two topics: whether professional decision makers and experts can be trusted and whether algorithms should replace informal judgments or not. Interestingly, proponents from the two perspectives seem to agree on the fact that evaluation of the quality of intuitive judgments requires an assessment of the predictability of the environment in which the judgment is made, and of the individual's opportunity to learn the regularities of that environment (Kahneman & Klein, 2009, p. 515). In this paper, we elaborate on this conclusion in two ways. A third approach, dynamic decision making (DDM), for assessment and evaluation of human decision making in general and professional judgments in particular should be considered when discussing human intuitive judgments. For this assessment a new method, collegial verbalization, was developed. Further, results from three different cognitive field studies are presented, showing that experts sometimes exhibit different kinds of maladaptive judgments but that they also adjust and change these intuitive judgments if they are able to get relevant information in each situation. The results also show that experts switch between immediate judgments and decisions for control. The results emphasize the importance of having decision support systems that give the opportunity to learn, and that the design and overall usability of such systems are critical for the evaluation of intuitive judgments, and whether to replace human operators with different level of automation or not. Complex tasks are easier to handle than complicated systems.

Heuristics (I) Q-302

1. An Eye-tracking Study of Feature-based Choice in One-shot Games.

Sibilla Di Guida, SBS-EM, ECARES – Université Libre de Bruxelles (Belgium)

Giovanna Devetag, Luiss Guido Carli, Department of Business and Management (Italy)

Luca Polonio, Department of Cognitive Science and Education, University of Trento, and Center for mind and Brain Sciences, University of Trento (Italy)

By analyzing the eye movements of subjects when playing a sequence of 3x3 games in normal form, we show that subjects perform a partial and selective analysis of the matrix, often ignoring the payoffs of the opponent and/or paying attention only to specific cells. Observed patterns suggest that subjects in one-shot games apply boundedly rational decision heuristics, which involve best responding to a simplification of the original decision problem, obtained either by ignoring the other players' motivations or by taking them into consideration only for a subset of possible outcomes. Finally, eye-movements are strictly correlated with strategic choices and can be used as a proxy of agents' strategic behavior.

2. Children's choices: (How) do decision strategies develop with age?

Stefanie Lindow & Tilmann Betsch, University of Erfurt (Germany)

Recent decision making research has repeatedly demonstrated that adults can holistically integrate multiple pieces of information and apply weighted additive (WADD) decision strategies for information integration (e.g., Glöckner & Betsch, 2008). To investigate the development of this capability, we adapted the open MouseLab technique for school-aged children. Participants perceive all information directly in an open 4 attribute x 2 option matrix. The attributes differ in terms of their relevance for choice. The setting of the decision game ensures an age-independent understanding of these differences in relevance. Thus, we are able to assess how different age groups (6 to 7-year-olds; 11 to 12-year-olds; adults) handle decisions in which multiple pieces of value-information must be integrated and weighted according to their relevance. In three experiments we find that in all age groups the majority of participants are classified as users of a WADD strategy (maximum-likelihood classification: Bröder & Schiffer, 2003). Simpler decision heuristics (e.g., lexicographic strategy) were less frequently applied by children and not at all by adults. The application of the WADD strategy goes along with a higher error rate in children compared to adults. This is also indicated by an increase in decision quality

with age. Overall, our findings demonstrate, in line with research on adults, that the capability to make good and quick decisions by holistically integrating multiple pieces of information is already present in young children. Our experiments on the development of decision strategies for information integration directly build on and extend previous child-decision-making research on strategies for search (standard MouseLab paradigm: e.g., Davidson, 1996; Klayman, 1985).

3. Developmental differences in children's use of simple heuristics: The case of the recognition heuristic.

Rüdiger F. Pohl, Department of Psychology, School of Social Sciences, University of Mannheim (Germany)

The recognition heuristic (RH) is a judgment strategy that can be applied to infer which of two objects has the larger criterion value, whenever only one of the two objects is recognized. According to the RH, decision makers simply choose the recognized object. The success of this heuristic depends on its ecological validity, that is, whether the probability of recognition is related to the unknown criterion value. Such ecological relations have generally to be learned through experience. Hence, the use of such heuristics as the RH should increase with children's age. We tested this hypothesis in two experiments, both comparing younger (9–10 years) and older (13–14 years) children. The children were first asked which of 12 world cities they recognized, and then – for all possible pairs of these cities – which city in each pair they judged to be the more populous one. Of special interest were the pairs in which only one of the cities was recognized so that the RH could potentially be applied. Actual use of the RH was estimated by means of multinomial modeling. We found in both experiments that both age groups used the RH substantially, but that older children employed the RH even more often than the younger ones did. This can be taken as support for the assumption that the ecological validities of such simple heuristics as the RH are learned through experience.

4. What's next? Disentangling availability from representativeness.

João Braga, Universidade de Lisboa – Faculdade de Psicologia Indiana Univeristy – Department of Psychological and Brain Sciences

Mário B. Ferreira & Steven J. Sherman

Judgment and decision-making research was transformed by the work of Tversky and Kahneman (1974), when they suggested that heuristics underlie most judgments, decisions, and predictions. However, the distinctions among the heuristics have never been clear. In particular, availability and representativeness have both been proposed to underlie the same judgment tasks, sometimes with different predictions for the judgment. In particular, in judging what outcome is likely to be next in tasks that have a recent streak using representativeness leads to a prediction of a change in the outcome (gambler's fallacy), whereas availability should lead to a prediction of a continuation of the current streak (the "hot hand").

We propose that availability (the direct use of accessibility) is cognitively simpler than representativeness (matching to an abstract representation of the expected outcome).

In 2 studies, we pit one heuristic against the other in binary outcome prediction tasks. In study 1 we find that participants who are not under cognitive load use representativeness to predict alteration after a streak (gambler's fallacy). However, under conditions constraining cognitive resources, participants are more prone to guess what's next based on the most salient and cognitively available exemplars, thus reducing the gambler's fallacy. In study 2, under self-paced conditions, alternations of the last of the sequence take longer than predictions that the streak is going to continue. Data also suggests that a) participants are not using the most accessible instances to make their predictions and b) are instead computing the similarity of the sequence with a representation of the event.

Symposium XIV: Honest lies? Cognitive process investigation of unethical judgment and behavior Q-401

Chair: Shaul Shalvi

Discussant: Ilana Ritov

1. Strategic dishonest behavior in monetary donations to social organizations.

Shahar Ayal, Ben Gurion University of the Negev

Guy Hochman, Duke University (United States)

Uri Gneezy, Rady School of Management-UC San Diego (United States)

Dan Ariely, Duke University (United States)

This study examines how the willingness to cheat for others is influenced by intergroup relationships and identifiability with the recipient of a donation. To test this issue, we developed an experimental paradigm in which players engage in a visual perception task that creates an incentive to cheat to alter or reduce the monetary payoff. The payoff was split between the player and the recipients of the donation. Consistent with our hypotheses, the results of two experiments show that the highest level of cheating was found when the donation was made to a positive-identifiability organization, intermediate levels of cheating were found when donations were made to a neutral-identifiability organization or when no donations were made, and when donations were made to a negative-identifiability organization there was no cheating or even vindictive cheating where participants purposely reduced the magnitude of the donation. Thus, we conclude that cheating may be used strategically to justify self-interests and promote one's goals. In contrast to altruistic cheating that was observed whether it led to self-benefit or not, vindictive cheating against groups with opposing agendas was observed only when harming others was not associated with inflicting harm to the self.

2. How intentions and deception influence attributions of responsibility in groups.

Tobias Gerstenberg, Department of Cognitive, Perceptual, and Brain Sciences, University College London, United Kingdom

Simeon Schächtele, Max Planck Institute For Human Development, Berlin

David Lagnado, UCL University College London

Yaakov Kareev, The Hebrew University of Jerusalem

In this talk, I will present evidence from a series of experiments demonstrating that responsibility attributions in groups as well as monetary punishments or rewards in dyads are influenced not only by actual outcomes but also, and to a larger extent, by intended outcomes. Our studies mirror everyday life in that intentions and outcomes are not perfectly correlated: a positive intention can lead to a negative outcome and vice versa. In Experiment 1, participants acted as external observers and evaluated the behavior of individuals in a group setting. When attributing responsibility to individuals for the group's success or failure, the majority of participants focused on intended rather than actual contributions. In Experiments 2 and 3,

participants interacted in dyads whereby one player chose between three devices that differed in terms of how likely the money would be split selfishly, fairly or generously. Based on having observed the first player's choice and outcome, the second player was free to reward or punish the first player. The results of Experiment 2 indicate that both outcomes and intentions affected the second player's responses. Moreover, unkind intentions were punished but kind intentions were hardly rewarded. In Experiment 3, intentions were stated as opposed to observed. Participants misstated their intentions frequently, thereby undermining the credibility of the statements. As a result, perceived honesty modulated players' responses. In sum, these studies support the general view that people are not only concerned with actual outcomes but also with potential outcomes that could have resulted if things had turned out somewhat differently.

3. Lies that feel honest – an fMRI investigation.

Gert-Jan Leijveld, Department of Psychology Leiden University, The Netherlands

Eveline A. Crone, Leiden University

Shaul Shalvi, Ben Gurion University of the Negev (Israel)

Justifications impact people's ethical judgment and behavior. When an immoral act can easily be justified, it is judged leniently. We asked participants, placed in an fMRI scanner, to judge how ethical different (dis)honest acts were, while varying their ability to justify those acts. Specifically, participants read a scenario describing other students instructed to privately roll a die twice and report the outcome of the first roll only to determine their payment. Higher reported outcome meant higher payoff. Since die rolls were private, participants could lie about the outcome of their rolls to boost personal profit. We varied justifications by providing information about the non-relevant for pay roll. The extra roll either matched the reported outcome, thus providing a justification for lying by switching the first and second outcomes (e.g., 1st=1, 2nd=4, report=4), or did not match it thus providing no justification for lying (e.g., 1st=1, 2nd=3, report=4). Participants were asked to rank on a 1-8 scale, "how much of a lie was it to report this outcome?" Results replicated prior findings suggesting justified lies are more leniently judged. Novel fMRI data further corroborated this finding showing increased activation for the anterior cingulate cortex and right prefrontal cortex, regions associated with cognitive control and conflict, for justified lies than for unjustified lies. Our results reveal the brain activity associated with people's tendency to judge justified lies leniently. It suggests people truly feel that some lies are rather honest.

4. Personality and Situational Factors Influencing Cheating Behavior.

Andreas Glöckner, University of Göttingen

Guy Hochman, Duke University (United States)

In a two-part study we investigated factors influencing cheating behavior. Personality factors were measured in an online questionnaire. In the lab session that took place one day later, participants completed 168 rounds of the flexible dot task, a visual-perception task that provides an incentive to cheat, in which participants repeatedly indicate on which side of a screen, left or right, there are more dots. The task used in this experiment extends previous paradigms in that it makes it possible to manipulate and measure situational factors that influence cheating behavior. Our results show that the magnitude of cheating is influenced by both situational and personality factors. Cheating increases with task difficulty as well as task repetition, but is not affected when the possibility of being detected decreases. In addition, cheating magnitude decreases with rational decision making style, but is not influenced by the personality factor honesty-humility. Finally, choices involving cheating are made quicker than choices involving no cheating and withstanding this temptation. Overall, our findings support an intuitive cheating hypothesis and highlight the multitude of factors (consciously and unconsciously) influencing cheating behavior.

5. Moral Firmness.

Shaul Shalvi, Ben Gurion University of the Negev (Israel)

David Leiser, Ben-Gurion University (Israel)

Firm moral judgment deems dishonest acts as categorically wrong, and considers any self-serving justification for them as further dishonesty. People however, commonly use self-serving justifications in order to feel honest even as they behave dishonestly, indicating reduced moral firmness. We test variation in moral firmness by comparing a sample of religious and secular female students. Arguably, religious people's upbringing and ongoing exposure to moral admonitions promote a firm moral approach which should translate into firmer moral judgments in adulthood. Results of a moral judgment experiment supported this proposition: Religious students judged lies more harshly than secular students, and were less sensitive to the availability of self-serving justifications. A moral behavior experiment provided support to the notion that moral firmness in judgment may translate to moral firmness in behavior: whereas

modest amount of lying was found among the secular students, no evidence for lying was observed among the religious student. Overall, we provide strong evidence for firm moral judgment among female religious students, and weaker evidence for firm moral behavior. We discuss the relation between firm moral judgment and behavior.

1.30pm–3.00pm

Symposium XV: Perspectives on the Current Crisis in Psychological Science: What It Is and Where It Should (and Should Not) Be Going

Q-101

Chairs and Discussants: Barbara Spellman & Klaus Fiedler

Convener:

Barbara A. Spellman, University of Virginia

Discussant:

None. Or all.

Psychological science is currently undergoing what some people call a "revolution" and others call a "crisis". Discussions about failures to replicate, and about fraud and fraud seekers abound. Many traditional journals are thinking about implementing new publishing requirements and formats. It seems like more open access journals are online every day. Some younger scientists feel confused and insecure, wondering how they are supposed to proceed without falling into a minefield; some older scientists feel that their established work is being threatened.

As psychologists, we are in a unique position to understand the causes of the problems, including the incentive structures in science, and to evaluate likely ways to fix it. But researchers first need to understand what is going on and why.

This symposium has three parts. First, Barbara Spellman, the Editor of Perspectives on Psychological Science, will describe the precursors to this "movement" – how it arose from various current concerns, none of which, by themselves, are new. She will also describe what is being done now by various journals and associations in response to the "crisis."

Second, Klaus Fiedler will talk about what he sees as some of the missteps in the current wave of

reform suggestions. He is concerned about the call for exact replications as potentially quashing new investigations. He believes that calls for more "statistical rigor" may be unproductive. And he is concerned that we should not be scaring scientists as we go about improving science.

1. Precursors of the Perspectives on Psychological Science journal and current editorial situation of the field.

Barbara Spellman, University of Virginia

2. Missteps in the current wave of reform: the call for exact replications as a potential quashing for new investigations.

Klaus Fiedler, Max-Planck-Institut

Individual Differences in JDM (III) Q-102

Chair: Gilly Koritzky

1. Predicting success in weight-management based on decision-making style.

Gilly Koritzky (presenting author), Camille Dieterle, Chanetlle Rice, Katie Jordan, & Antoine Bechara, The University of Southern California

Obesity and its adverse effects on health are becoming increasingly prevalent worldwide. However, behavioral interventions in weight management are highly limited in their success: Accounts of weight management programs' effectiveness show that the majority of participants do not lose weight significantly. Understanding the cognitive properties that contribute to (or impede) successful weight management may enable the design of improved interventions. The literature suggests that individual differences in decision-making impairments may account for the relative difficulty a person encounters when trying to lose weight.

We used a cognitive model (the Expectancy Valence model) to distinguish between the decision-making styles of successful and unsuccessful participants in a weight-management program

(N=40). We found that compared to unsuccessful dieters, successful dieters (a) demonstrated more balanced weighting of gains and losses; and (b) were less likely to be influenced by recent information at the expense of relying on past experience.

The results suggest that improving these properties may foster better results among dieters. Results also sustain the assertion that general measures of impaired decision-making might be too crude, and that modeling the underlying components of decision-making is a useful way to detect individual differences corresponding to real-life behavior.

2. Retributive and compensatory reactions to injustice under time pressure and time delay: the effect of Justice Sensitivity.

Olga Stavrova & Thomas Schlösser, Department of Sociology and Social Psychology, University of Cologne (Germany)

The present research examines the interplay of intuitive and reflective processes in justice restoration behavior in third-party interactions as well as the role of individual differences in Justice Sensitivity in the relative importance of intuition and reflection.

196 participants witnessed an unfair reward allocation among two other players and were endowed with 5€ to punish the perpetrator and/or compensate the victim. One group was asked to make their intervention decisions within 15 seconds (time pressure condition), the second group was assigned to wait for 2.5 minutes before they could enter their decisions (time delay), the third group was given 2.5 minutes before making the decisions and was asked to take notes of every thought they had during this waiting time (time delay and thought listing condition), finally, the fourth group was just asked to make their decision (control condition).

Our results show that participants in time pressure condition spent less money altruistically on punishing the perpetrator than participants who were given a time delay. This effect was moderated by the personality trait of Justice Sensitivity: compared to the control condition, giving participants a time delay increased punishment among justice insensitive participants and decreased it among justice sensitive participants. Time manipulation did affect compensation decisions, neither alone nor in interaction with Justice Sensitivity. Finally, the content-analysis of individuals' thoughts indicated that while punishment was driven by both rational and emotional processes as well as by general justice concerns, compensation was almost exclusively triggered by justice motives and rational reflections.

3. How episodic and working memory affect rule- and memory-based judgments.

Janina Anna Hoffmann, Bettina von Helversen, & Jörg Rieskamp, University of Basel (Switzerland)

Making accurate judgments, such as correctly diagnosing a patient, is an essential skill in everyday life. However, little is known about the basic cognitive skills required for accurate judgments. Research on judgment and categorization processes suggests that people often rely on two kinds of strategies when making judgments: rule-based and memory-based strategies. These strategies differ in the cognitive abilities they require. Specifically high working memory capacity may benefit rule-based judgments, whereas good long-term memory may be crucial for memory-based judgments. We investigated this hypothesis following an individual differences approach. 177 participants performed two judgment tasks that were either best solved by a rule-based or a memory-based strategy. Additionally, we measured working memory capacity and episodic memory with three tests. Consistent with our hypothesis structural equation modeling showed that working memory capacity predicted judgment accuracy in the rule-based task, but not in the memory-based task. In contrast, episodic memory predicted judgment accuracy in the memory-based task, but not in the rule-based task. Apparently, different memory abilities are essential for successfully adopting different judgment strategies.

4. The motivational nature of causal illusions.

Perales, J. C., Navas, J.F., Torres, A., Catena, A., & Maldonado, A. Mind, Brain, and Behavior Research Center, Universidad de Granada, Spain*

Humans are prone to infer causal links where these do not exist. Still, some people are more prone, and some circumstances more propitious than others. Lab tasks designed for people to judge the causal linkage between two dichotomous events (cause-outcome) have unveiled that causal illusions in non-contingent situations are stronger when the candidate cause or the effect is more frequent.

In the present study, participants were presented with the noncontingent, trial-by-trial display of a candidate cause (mentally imaging a free throw), and an outcome (scoring or not), as a series of fictitious attempts. In the low cause-density condition the thrower imaged the shot in 25% of the trials. In the high-density one, he did so in 75%. In both, the probability of $P(O|C)=P(O|-C)=.5$.

In each trial, participants were asked to predict whether the thrower would score or not, and, after learning the outcome, the degree to which she/he thought she/he would be able to make a correct prediction in the following trial (Feeling-of-learning judgment, FOL). After each 16-trial block, participants were asked to judge the degree to which imaging was effective to improve scoring (causal judgment).

We computed how sensitive FOL judgments were to the result of the preceding prediction. Sensitivity to feedback broadly varied across individuals, and was predictive of how much causal judgments departed from zero (i.e. were illusory), but only in the high cause-density condition. Sensitivity to feedback also significantly correlated with trait aspects of impulsivity.

This effect demonstrates that some causal illusions are not originated in passive exposure to information, but on the interaction between individuals' predictions about the causes, and the motivational consequences of such predictions.

Risk and Loss Aversion (III) Q-103

Chair: Olivier l'Haridon

1. Source-dependence of utility and loss aversion: A critical test of ambiguity models.

Olivier l'Haridon, University Rennes

This paper tests whether utility is the same for risk and for uncertainty. This test is critical to distinguish models that capture ambiguity aversion through a difference in utility between risk and uncertainty (like the smooth ambiguity model) and models that capture ambiguity aversion through a difference in event weighting between risk and uncertainty (like multiple priors and prospect theory). We designed a new method to measure utility and loss aversion under uncertainty without the need to introduce simplifying parametric assumptions. Our method extends Wakker and Deneffe's (1996) trade-off method by allowing for standard sequences that include gains, losses, and the reference point. It provides an efficient way to measure loss aversion and a useful tool for practical applications of ambiguity models. We could not reject the hypothesis that utility and loss aversion were the same for risk and uncertainty suggesting that utility reflects attitudes towards outcomes and not attitudes towards ambiguity. Sign-

dependence was important both for risk and for ambiguity. Utility was S-shaped, concave for gains and convex for losses and there was substantial loss aversion. Our findings support models that explain ambiguity aversion through a difference in event weighting and suggest that descriptive models of ambiguity aversion should allow for reference-dependence.

2. Group decision rules and group rationality under risk.

Aurélien Baillon, Ning Liu, Erasmus Research Institute of Management; Econometric Institute, Erasmus University, The Netherlands

Han Bleichrodt, Erasmus School of Economics

Peter Wakker, Erasmus School of Economics

This paper investigates rationality of group versus individual decisions under risk. We carry out individual-group-individual experiments under a majority rule and under a unanimity rule. In monotonicity tasks, groups are more rational than individuals under both rules. In common consequence (Allais) tasks, groups are more rational under unanimity than individuals, with no difference under the majority rule. In common ratio (Allais) tasks, groups do not differ from individuals under both rules. Apparently, monotonicity tasks most clearly have a rational component, and common ratio tasks have so the least, and unanimity rules better enhance rationality than majority rules.

3. Third-party decision-making under risk.

Annabel Losecaat Vermeer, (i) Behavioural Science Institute, Radboud University Nijmegen, The Netherlands, (ii) Donders Institute for Brain, Cognition, and Behaviour, Nijmegen, The Netherlands

Alan Sanfey, (i) Behavioural Science Institute, Radboud University Nijmegen, The Netherlands (ii) Donders Institute for Brain, Cognition, and Behaviour, Nijmegen, The Netherlands (iii) University of Arizona, USA

Living in a social environment entails that we not only make choices for ourselves, but also on behalf of others. For instance, parents make decisions on behalf of their children, and sometimes children on behalf of their parents. Literature on third-party decision-making shows many inconsistencies concerning differences between self-other choices, particularly for risk-taking. Our aim is to explore how third-party decision-making can influence risk preferences, and in

particular to examine whether third-party decisions may induce more deliberative "cold" decision-making, resulting in less susceptibility to reflection effects.

In this study participants played a series of trials where they could either lose or win money depending on their performance on a time-estimation task. Immediately following gain/loss feedback on each trial participants chose to either accept or reject a 50-50 mixed gamble that would either redeem or double their loss (after an initial loss) or double or eliminate their gain (after an initial gain). Alternatively, participants could decide not to play this gamble and keep the initial gain or loss. Gamble outcomes were subsequently presented and added to a running balance. The critical manipulation was for whom; "self" or "other", participants played the game. Results demonstrate that participants gambled more after incurring a loss as compared to a gain ($p < .001$). The shift in risk preferences occurred in both groups, however, it was significantly weaker for the "other" group ($p < .05$). This study demonstrates that third-party choices reduces susceptibility to the feedback context of the decision, with a plausible explanation being a decrease in perceived psychological distance to the feedback and outcome, resulting in more deliberative decisions.

4. Will you still feed me? The ratio bias vs construal level theory revisited in different risk domains.

Volker Thoma, University of East London, School of Psychology

According to the ratio-bias (RB) phenomenon statements such as "[cause] X is killing 1,200 out of 10,000 people" is judged as riskier than the equivalent information that "X is killing 12 out of 100 people". This is because humans focus on the concrete nominator and ignore the denominator. Translated to a time frame example, "100 people die from cancer every day" should be judged as less risky than "36,500 people die from cancer every year". However, construal level theory (CLT) states that near events are mentally represented as more concrete, and specific, and therefore judged as riskier than far events that are construed as more abstract. According to Bonner and Newell (2008) in this case the predictions of CLT and RB are opposite because risk statistics are presented both as frequencies and as temporal information. Using risk statements in the domain of health they found that participants' estimates of risks followed the RB. The current study looked at the role of age, concreteness, and type of domain on risk judgments. Fifty-one participants judged four health risks and four (unspecified) risks from public sector budget cuts to the average citizen of England and Wales on a 25-point Likert-

scale. The risks were either presented in year frames or day frames. There were no main effects, though there was a 3-way interaction of the factors age group, domain, and frame: participants under 40 years (n=27) judged risks from budget cuts (but not health risks) higher in the year frame than in the day frame. These results are not easily explained by a role of concreteness of risk information but rather indicate that personal relevance and the type of risk domain influence risk perception.

Medical Clinical JDM (II) Q-301

Chair: Michelle E. McDowell

1. Understanding prostate cancer screening behavior: Family history, cognitive heuristics, and perceptions of risk.

Michelle E. McDowell, Harding Center for Risk Literacy, Max Planck Institute for Human Development & Behavioural Basis of Health, Griffith Health Institute, Griffith University

Occhipinti, S, Behavioural Basis of Health, Griffith Health Institute, Griffith University

Chambers, S. K, Behavioural Basis of Health, Griffith Health Institute, Griffith University & Centre for Clinical Research, University of Queensland

Despite uncertainty as to the benefits and harms of prostate cancer screening, many men screen for prostate cancer. This study investigated the contribution of cognitive heuristics to explain why men screen for prostate cancer and how personal experience influences the use of heuristics and predicts whether or not men engage with disease risk.

Men with a family history of prostate cancer (n=207) and men without a family history (n=239) reported their screening behavior, perceived risk, availability of information about prostate cancer (availability heuristic), and perceived similarity to the typical man who gets prostate cancer (representativeness heuristic). A path model explored relationships between family history, perceived risk, and screening behavior, and the contribution of cognitive heuristics to explain these relationships.

Men with a family history reported greater risk perceptions and prior screening behavior. Risk perceptions did not predict screening for men with a family history. Cognitive heuristics predicted risk perceptions and screening beyond other known predictors. Family history moderated the relationship between similarity perceptions and perceived risk and was significant only for men with a family history. A greater number of recent discussions about prostate cancer mediated the relationship between family history and perceived risk. The

number of friends and acquaintances men knew with prostate cancer mediated the relationship between family history and screening.

Cognitive heuristics provide an explanation for how personal experience with a disease can influence risk perceptions and inform health behavior. The importance of examining how men engage with information in their environment to make judgments about risk and health behavior is discussed.

2. Using emotions conveyed by patient narratives: Comparing reassurance- and regret-based stories in colorectal cancer screening.

Presenting author:

Teresa Gavaruzzi, Department of Surgical, Oncological and Gastroenterological Sciences - University of Padova (Italy)

Co-authors:

Michela Sarlo, University of Padova (Italy)

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Franca De Lazzari, S. Antonio Hospital, Padova (Italy)

Rino Rumiati, University of Padova (Italy)

Lorella Lotto, University of Padova (Italy)

Patient narratives or personal stories are often used in resources for patients (e.g., Bekker et al., 2012). Although many providers and patients like narratives, the literature suggests that they affect or bias risk perception and choice (e.g., Winterbottom et al., 2008; 2012). Nevertheless, there is a paucity of research on what makes narratives powerful and under which circumstances.

In the context of colorectal cancer screening, Study 1 compared the effect of a narrative describing a positive (i.e., reassurance), negative (i.e., regret) or neutral scenario with a control condition without narrative on the intention to undergo the test in individuals aged 45–65 years. In Study 2 (in progress), with a within participants design, we assessed participants evaluations of emotions conveyed by the three narratives (in random order) and their physiological correlates (skin conductance, heart rate, and corrugator muscle activity) during narrative reading.

Results from Study 1 suggest that describing the decision have an effect per se, as all narratives increased intention to undergo screening relative to the condition without narrative (Kruskal-

Wallis H test, $p=.024$). The reassuring narrative resulted in the highest intention to undergo testing (Kruskal-Wallis H test, $p=.003$).

Preliminary results from Study 2 suggest that the reassuring narrative evoked significantly less fear, anxiety, and sadness than the other narratives ($F(6,156)=3.42$; $p<.004$). Skin conductance level positively correlated with the intensity of sadness and fear in the neutral condition, and with anxiety in the reassurance condition, whereas no significant correlations were found for the regret condition.

Reassuring narratives seem more effective than regret narratives in promoting screening uptake.

3. When 1% Chance for Me \neq 1% Chance for You: Self-other Discrepancies in Probability Weighting in Decisions about Health.

*Dafina Petrova, University of Granada, Spain & University of Amsterdam, The Netherlands
(Presenting and corresponding author)*

Rocio Garcia-Retamero, University of Granada

Joop van der Pligt, University of Amsterdam, The Netherlands

Decision making for others is common in medicine where surrogates (family and doctors) frequently make treatment decisions for others based on prognostic information. Research on individual decision-making shows that people tend to overweigh small and underweigh large probabilities. Our aim was to investigate to what extent this pattern holds in decisions for others.

We simulated a decision surrogacy situation in the laboratory and investigated self-other discrepancies in probability weighting. Participants decided whether they and another person should opt for vaccination against a sexually-transmitted virus. We manipulated the information participants received about the other person's preference regarding the decision at hand. Participants evaluated various probabilities of contracting the virus.

When there was no information about the other person's preference, participants were more accurate (i.e., were less biased in weighing the probabilities) in their decisions for the other than for themselves. Providing information about the other person's preferences reversed this accuracy effect. In fact, knowing the other person's attitude toward risk decreased surrogates' accuracy. However, these differences occurred only when participants decided for the other person first.

A neutral standpoint might increase surrogates' accuracy, while providing preference information might decrease it, due to giving excessive weight to that information. However, if surrogates make risky decisions for themselves first, self-other discrepancies in accuracy could

be less pronounced. More research is needed to investigate surrogate risk evaluation in medical practice. This should also involve real problem holders selected from relevant patient and surrogate samples.

4. Reconsidering an initial diagnosis: the role of conflicting information and meta-cognitive feelings of rightness.

Amanda Woolley, King's College London (United Kingdom)

Olga Kostopoulou, King's College London (United Kingdom)

We tested the hypothesis that revising an initial diagnosis is predicted by the diagnostician's "Feelings of Rightness" (FoR; Thompson et al., 2011) and the nature of information subsequently discovered.

159 medical students read 2 patient vignettes, each describing 2 visits of the patient to the GP. The first visit strongly suggested a routine 'target' diagnosis. Participants gave their diagnosis and their FoR on a 0-100 VAS. Only target diagnosis responses were analysed. The second visit differed by experimental condition. In the Evidence-based condition (EV), the presentation contained a "red flag" sign for cancer, inconsistent with the target diagnosis. In the non-evidence-based (nEV) condition, the presentation contained an inconsistent, but ambiguous cue. In a Consistent condition the patient was improving following treatment for the target diagnosis. Final diagnoses were coded as changed or unchanged from the target.

Heuristics (II) Q-302

Chair: Florian Artinger

1. Pricing in the Face of Uncertainty – Simple Strategies in a Complex Environment.

Florian Artinger, Max Planck Institute for Human Development & Warwick Business School, University of Warwick

Gerd Gigerenzer, Max Planck Institute for Human Development

Do firms employ simple heuristics as pricing strategies in a competitive environment? Price setting can be subject to a large degree of uncertainty arising from market volatility, the need to evaluate consumer's willingness to pay, and strategic considerations concerning competitors.

Simon (1955), in his foundational article on Bounded Rationality, proposes that in such environments firms employ a simple aspiration level strategy to set prices. In this paper we investigate the pricing strategies of used car dealers who operate in a competitive and highly transparent market. An analysis of on-line pricing data shows that the majority of 748 car dealers follow the principles of aspiration-adaptation, rather than competitive, state-dependent pricing. Interviews with dealers in the high-competitive segment of the market eliminate alternative theoretical accounts as an explanation of the observed behavior. We show that a pricing strategy with an initially high aspiration level and a 30-day time interval leads to higher profit than the alternative strategies used in the market.

2. Pseudo Diversification in the Stock Market: The Role of Perceived Diversity in Judgments of Investment Portfolios.

Shahar Ayal, Interdisciplinary Center (IDC) Herzliya

Assaf Amit Amit, Interdisciplinary Center (IDC) Herzliya & Tel Aviv University

David Disatnik, Interdisciplinary Center (IDC) Herzliya & Tel Aviv University

Dan Zakay, Interdisciplinary Center (IDC) Herzliya

According to classic Portfolio Theory, the variance of the return on an investment portfolio may be used as a measure to estimate the portfolio's risk level. One of the normative ways to reduce this risk is to diversify the sources of investment. This research examined situations in which individuals' perceptions of diversification leads them to suboptimal financial decisions when constructing their investment portfolio. We conducted three studies in which participants were required to judge or choose from sets of alternative investment portfolios that included different types of securities (stock indices and single stocks). The findings revealed three systematic errors concerning diversification of investment portfolios: (1) a biased perception of multiplicity (i.e., the number of securities in the portfolio), (2) a biased perception of distinctiveness (i.e., the correlations between the securities that form the portfolio), and (3) a preference for over-diversification after being exposed to past information on gains but under-diversification after being exposed to past information on losses. We discuss the practical implications of our results and suggest techniques to improve the way individuals employ heuristic rules to choose the optimal level of diversification for their investment portfolio.

Neural Processes Q-401

Chair: X. T. Wang

1. A Meta-Analysis of Framing Effects: Behavioral Dynamics and Neural Correlates.

X. T. Wang, University of South Dakota, South Dakota, USA

Li-Lin Rao, Institute of Psychology, Chinese Academy of Sciences, China

Research on framing effects has been one of few multidisciplinary endeavors joined by psychologists, economists, political scientists, and management and marketing researchers. Framing effects epitomize the power of linguistic subtlety in regulating decision making, showing that different ways of framing, phrasing, or presenting virtually identical choice options systematically affect risk preference, evaluation of experience, and persuasiveness of messages. Given its central role in the studies of decision biases, the framing effect has been used as an experimental probe for understanding general mechanisms of human judgment and decision making. Researchers have proposed various models explaining the framing effect. However, it was not until recently that research of framing effects started to focus more on psychological mechanisms above and beyond phenomenology. We conducted a meta-analysis of neural correlates of framing effects. The topographic convergences from a total of 27 foci found in the fMRI studies of framing effects revealed two key brain areas underlying framing effects: the left anterior cingulate cortex (ACC) and the right inferior frontal gyrus (IFG). Together with behavioral findings, these results suggest that valence framing as a secondary cue becomes most salient and effective when primary contextual or social cues are absent or incongruent. The processing of choice problems under these conditions call for an ambiguity-reducing and conflict-monitoring function, which would result in the ACC activation. Second, the right IFG activation suggests that the nature of valence framing is both semantic and hedonic, involving not only verbatim linguistic analysis but also interpretation of its affective tones and metaphorical implications.

2. Losses amplify the role of frontal asymmetry predispositions.

Eldad Yechiam, Associate Professor at the Technion – Israel Institute of Technology, and head of the Behavioral Sciences area

Ariel Telpaz, Technion – Israel Institute of Technology

Frontal cortical asymmetry measured using EEG at rest is considered a stable marker of approach-avoidance behaviors and risk taking. We examined whether this relation is moderated by the availability of losses, and their ensuing effect on task attention. Fifty-seven participants

performed an experiential decision task in a gain-only, loss-only, and mixed (gain and losses) condition. Increased risk taking on the part of individuals with relatively high activation in the left frontal cortex was only observed in the task involving both gains and losses. Event-related potential analysis sheds light on the processes leading to this pattern. Left-frontal dominant individuals had increased fronto-central P300 activation following risky compared to safe outcomes, while right-frontal dominant individuals had increased error-related negativity following losses compared to gains. Both of these dynamics emerged only when losses were contrasted with gains. As the participants did not show loss aversion (like in similar experiential tasks) the results are interpreted as a consequence of increased task attention and reliability with losses. The findings also stress the merit of an interactionist approach to the study of frontal asymmetry, with ecological cues such as losses appearing to enhance the role of this brain disposition on behavior.

3. The brain represents value by rank order within a distributed network of varying context dependency.

Timothy L. Mullett, University of Nottingham (United Kingdom)

Many studies have found brain regions which respond to financial rewards and amounts of money. These studies show that larger values elicit greater activity and it is often implied that there is an isomorphic relationship where an increase in value elicits a concomitant increase in activity. However, this cannot be the case as neural firing has a biologically defined maximum but financial values can increase infinitely. We use fMRI to address the relationship between financial value and the response of these regions, investigating the role of context and rank order. Trials were separated into high and low value blocks such that it is possible to investigate the effect of a change in surrounding trials upon the encoding of financial value. The ventral striatum was dependent upon "local context", with its activity representing the current stimulus' relative value compared only to items in the current block. Conversely the ventral medial Pre-Frontal Cortex and Anterior Cingulate Cortex respond independently of block but also do not represent the absolute values of stimuli. Our use of stimuli values with a non-linear distribution allow us to identify the pattern as representing rank order.

Posters

- 1 **A Cross-Culture Study of the Basic Properties of Experience-Based Decisions**
Davide Marchiori, Sibilla Di Guida, Ido Erev
- 2 **A Lack of Appetite for Information and Computation: Simple Heuristics in Food Choice**
Michael Schulte-Mecklenbeck, Matthias Sohn, Emanuel de Bellis, Ralph Hertwig
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