

**The Center for Theoretical Behavioral Sciences mini-conference on:  
Internet-based evaluation of decision-theoretic approaches**

**Conference Dates:** January 19-20, 2023; daily 10:00 AM until 5:30 PM (PST).

**Organizers:** Kimberly A. Jameson (UC Irvine) & Ulf Dietrich-Reips (University of Konstanz, Germany)

**Location:** UC Irvine campus, in The Luce Conference Room – SSPA 2112\*

\*This meeting will aim to provide a hybrid program with both in-person and remote attendance options, and zoom presenters. <https://uci.zoom.us/j/96518677023>

*In-person attendees are asked to remain mindful during this event and practice standard COVID masking protocols and social distancing when possible.*

**Description:**

The recent pandemic, with its constraints on in-person laboratory research, has heightened demand for tools and methods that remotely assess and measure the theoretical factors that are inherent in models of perceptual, cognitive, and economic choice behaviors. The presentations in this conference address challenges often encountered when conducting science *at-a-distance*, and present results that advance the theoretical explanations derived through internet-based research, as compared to theories derived from laboratory interactions.

**Presenters and Schedule**

**Thursday, January 19<sup>th</sup>, 2023.** <https://uci.zoom.us/j/96518677023>

- 10:00 AM      *Welcome – Coffee, tea and pastry.  
Internet-based solutions with Machine-Learning and Human Choice Behavior.*  
Kimberly A. Jameson (UCI), Prutha Deshpande (Ohio State University), & Sergio Gago (UCI).
- 10:30            *Internet-Based Methods for Assessing Data Literacy.*  
Jeff Mulligan (UC Berkeley, consultant), Jeremy Wilmer (Wellesley College) & Sarah Kerns (Wellesley College).
- 11:30            *Trends and Methods in Digital Research Methodology.*  
Ulf-Dietrich Reips (University of Konstanz).
- 12:30 PM      Lunch Break. (<http://www.imbs.uci.edu/~kjameson/lunchoptions.pdf>)
- 2:00             *Big Sample Sizes in Internet Research are not Necessarily More Powerful.*  
Gary H. McClelland (University of Colorado Boulder).
- 3:00             *The Company Words Keep Influences Judgment, Decision Making, & Aesthetics.*  
Norbert Schwarz (University of Southern California), David Hauser (Queen's University), Charles Zhang (UC Riverside, & Lynn Zhang (University of Southern California). **Zoom Presenter.**

- 4:00 Refreshment Break.
- 4:30 *Experimental Social Science Research Network.*  
Stephan Jagau (UCI).
- 5:30 Meeting adjourned.
- 6:15 *Group Dinner.* (<http://www.imbs.uci.edu/~kjameson/dinnerthursday.pdf>)  
*Carpools depart by 6:00 to Bistango 19100 Von Karman Ave. Irvine.*

**Friday, January 20<sup>th</sup>, 2023.** <https://uci.zoom.us/j/96518677023>

- 10:00 AM Welcome – Coffee, tea and pastry.
- 10:30 *Collective Behavior in Soccer: Tracking Data and Networks.*  
Ulrik Brandes (ETH Zurich, Social Networks Lab). **Zoom Presenter.**
- 11:30 *Understanding Social Vulnerability and Susceptibility in Online Discussion Forums.*  
Kirbi Joe (MITRE). **Zoom Presenter.**
- 12:30 PM Lunch Break. (<http://www.imbs.uci.edu/~kjameson/lunchoptions.pdf>)
- 2:00 *Probabilistic Choice Induced by Strength of Preference.*  
Dan Cavagnaro (Cal State Fullerton).
- 3:00 *A Comparison of Six Models of Salary Satisfaction.*  
Michael H. Birnbaum (Cal State Fullerton) & Julien Rouvère (Cal State Fullerton).
- 4:00 Refreshment Break.
- 4:30 *Center-Surround, Chimeric Face Processing, Picnics on Islands, and Tori.*  
Donald G. Saari (UCI) & Louis Narens (UCI).
- 5:30 *Closing Remarks: Donald G. Saari (UCI).*  
*Meeting Adjourned.*

*For information on program or attendance questions contact Kimberly Jameson ([kjameson@uci.edu](mailto:kjameson@uci.edu)).*

Please use the following zoom link for the conference:

<https://uci.zoom.us/j/96518677023>

Meeting ID: 965 1867 7023

## Presentation Abstracts

Thursday, January 19<sup>th</sup>, 2023. <https://uci.zoom.us/j/96518677023>

### 1. *Internet-based solutions with Machine-Learning and Human Choice Behavior.*

Kimberly A. Jameson (UC Irvine), Prutha Deshpande (Ohio State University), & Sergio Gago (UC Irvine).

Contact: [kjameson@uci.edu](mailto:kjameson@uci.edu)

**Abstract:** Internet-based platforms for conducting research, empirical training, and education in the behavioral science are *having a moment* right now. Mastery of content creation for such platforms – as well as managing user experience, collaborative user-interactions, maintaining empirical rigor and data integrity – is crucial, and it requires balancing demands of lab-based science and education against a range of constraints imposed by remote-access pragmatics. But aside from their timeliness, why are such platforms and their internet-based research approaches appropriate topics for consideration in the new Center for Theoretical Behavioral Sciences? We present an example involving a problem solved (in part) by AI and (in part) by human cognition and perception, which we think illustrates ways to explore the linkages and common principles underlying both forms of processing, notwithstanding the differences and limitations that distinguish human cognition and AI minds.

### 2. *Internet-based Methods for Assessing Data Literacy.*

Jeff Mulligan (Freelance vision scientist, formerly with UC Berkeley), Jeremy Wilmer (Wellesley College) & Sarah Kerns (Wellesley College). Contact:

[jbmull@gmail.com](mailto:jbmull@gmail.com)

**Abstract:** Many day-to-day decisions can profitably be informed by data. Sometimes the necessary data may be obtained by direct observation, such as deciding whether or not to carry an umbrella by looking out of the window at the sky. But often data informing important decisions have been collected by others. In such cases, optimal decision-making depends upon effective communication to enable accurate interpretation of the data. But how can we assess whether or not these data communications have succeeded? In this talk we present a novel technique for assessing comprehension of a summary graph by asking participants to report their internal model of the underlying raw data. Initial results and possible generalizations of the technique will be discussed.

### 3. *Trends and Methods in Digital Research Methodology.*

Ulf-Dietrich Reips (University of Konstanz). Contact: [reips@uni-konstanz.de](mailto:reips@uni-konstanz.de)

**Abstract:** This talk reviews principles, methods, state-of-knowledge, and trends in digital research methodology in the behavioral and social sciences, with a focus on online experimenting. Several Internet-based methods are presented and discussed that have developed over more than 25 years and which turned out to become important in research methodology. Examples are one-item-one-screen design, seriousness check, instruction manipulation and other attention

checks, multiple site entry technique, subsampling technique, warm-up technique, and web-based measurement. Pitfalls and best practices will be presented, especially regarding dropout and other non-response, recruitment of participants, and interaction between technology and psychological factors. Recent developments in new methodologies, technological solutions, and tools are also discussed. Mobile Experience Sampling methodology has advanced quickly in recent years. Samply (at <https://samply.uni-konstanz.de>) is a user-friendly web and smartphone application for conducting experience sampling studies. WEXTOR, the experiment generator available from <https://wextor.eu> just received a modern, fully responsive update. It continues to follow a “good methods by design” philosophy and can be used to design laboratory and online experiments coding-free in a guided step-by-step process. Among dozens of new features it now includes sharing of experiments and 3D previews of display on devices. The talk concludes with an outlook on future developments in Internet-based research and a research synthesis on the edge of current scientific frontiers in digital research methodology in the behavioral and social sciences.

#### **4. *Big Sample Sizes in Internet Research are not necessarily More Powerful.***

Gary H. McClelland (University of Colorado Boulder).

Contact: [gary.mcclelland@colorado.edu](mailto:gary.mcclelland@colorado.edu)

**Abstract:** Many published articles based on Internet research provide no analysis of statistical power, presuming that the large sample sizes speak for themselves. Additionally, many Internet researchers use sloppy analyses that further reduce statistical power. The result is that many such studies have far less statistical power than a well-designed experiment with far fewer observations. The key to understanding power is the variance of predictor variables. We examine this relationship using interactive data-visualizations and make suggestions for how internet researchers might improve their statistical power. Finally, special attention is given to the use of median splits, which has become common in Internet research. Dichotomizing one predictor reduces power in the same way as discarding a third of one’s sample. But dichotomizing two correlated predictors effectively confounds the estimates as weighted averages of each other.

#### **5. *The Company Words Keep Influences Judgment, Decision-Making & Aesthetics.***

Norbert Schwarz (University of Southern California), David Hauser (Queen’s University), Charles Zhang (UC Riverside), & Lynn Zhang (University of Southern California).

Contact: [norbert.schwarz@usc.edu](mailto:norbert.schwarz@usc.edu)

**Abstract:** Words appear in the company of other words. These word collocations in the corpus of language influence associations and metacognitive experiences of fluent processing with downstream consequences for judgment, decision making, and aesthetic appreciation. To address the influence of associations, we take advantage of seemingly neutral words that predominantly occur alongside positive (negative) words in natural language. Despite lacking valence when evaluated in isolation, such semantically prosodic words activate the evaluative associations of their usual company, which colors judgment in

unrelated domains. For example, people are more likely to infer that “endocrination” (a fictional medical outcome) is negative when it is “caused” (a word that predominantly collocates with negative concepts, from trouble to death) rather than “produced” (a word that collocates with positive as well as negative concepts). These effects can also be observed on implicit measures, where semantically prosodic words function like valenced words despite lacking valence when evaluated in isolation. Going beyond mere collocation, people are also sensitive to collocation order. For example, “burger and fries” is a more common ordering than “fries and burgers,” which is reflected in differential processing fluency. Processing fluency, in turn, informs numerous judgments, including judgments of truth, trust, preference, and beauty. Hence, statements that conform to the more frequent collocation order are seen as more truthful and photo arrangements that follow the more frequent collocation order of the underlying semantic concepts are preferred and evaluated as more beautiful.

## **6. Experimental Social Science Research Network.**

Stephan Jagau (UCI). Contact: [sjagau@uci.edu](mailto:sjagau@uci.edu)

**Abstract:** Experimental social science research increasingly relies on designs that outgrow the traditional decision-making laboratory. Examples include field experiments, large-scale experiments, and online experiments. ESSRN is an initiative of four Universities of California and of the National Research Platform to revamp laboratory infrastructure and meet the demands of cutting-edge social science research. The technological basis for ESSRN is state-of-the-art containerization and container orchestration using Docker, Kubernetes, and JupyterHub. The containerization of experimental software brings two major benefits. First, containerization facilitates the curation of deployment-ready experimental software, and it enables instant replications of computerized decision-making experiments at any location across the web. This is expected to dramatically increase the external validity and reliability of social science experimentation. Second, containerization enables ESSRN to support large numbers of virtual experimenter workspaces in parallel and to seamlessly accommodate lab-, field-, and online-experiments on a vast and diverse multi-institutional subject pool. The long-term vision is to grow ESSRN into a network of social science laboratories serving as a national and international hub for experimental social science research. We are looking to build new labs, add existing labs to ESSRN, recruit skilled programmers/software engineers, and collaborate on grants.

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**Friday, January 20<sup>th</sup>, 2023.** <https://uci.zoom.us/j/96518677023>

## **7. Collective Behavior in Soccer: Tracking Data and Networks.**

Ulrik Brandes (ETH Zurich, Social Networks Lab). Contact: [ubrandes@ethz.ch](mailto:ubrandes@ethz.ch)

**Abstract:** Sports analytics is increasingly based on data tracking athletes' behavior. In this talk, I will draw a comparison with remote sensing in socio-technical systems, where decision making is also observed through constrained forms of interactions, albeit defined by technological

means rather than the laws of the game. This is exemplified by a recent approach to study formations in football (the European variety also known as association football, soccer, or simply the beautiful game) with dynamic proximity networks.

### **8. Understanding Social Vulnerability and Susceptibility in Online Discussion Forums.**

Kirbi Joe (MITRE). Contact: [kirbijoe@gmail.com](mailto:kirbijoe@gmail.com)

**Abstract:** Continued development in social media technology increases opportunities for adversaries to exploit social vulnerabilities within the online domain. To minimize risks and consequences arising from these vulnerabilities, it is important to both strengthen the identification of threats and propose effective mitigations. Specifically, when national events are impacted by malignant foreign actors who spread mis- or disinformation, there is a need to build up a nation's knowledge-based security by identifying unsupported or untrue claims that are the result of concerted manipulation. MITRE has proposed the application of a system-of-systems methodology to identify cyber-enabled influences on events. This methodology will serve as a means of developing novel mitigation strategies and tactics. We have developed a novel information-theoretic framework on a collection of online Reddit forums to understand how individual user behavior can influence collective thought and sentiment. Utilizing data from these online forums allows us to analyze the natural emergence of themes within a community and perhaps begin to understand how certain actors may exploit properties of the community to sway discourse in their favor. Proof-of-concept results suggest that susceptibility to influence may be correlated to the frequency of posting traffic within online forums. Therefore, proposed mitigation strategies should seek to monitor communities of interest during instances of low posting traffic as these are times when the population would be most at risk of adopting harmful narratives or misinformation. *Copyright © 2023. The MITRE Corporation. All Rights Reserved. Approved for Public Release; Distribution Unlimited. Public Release Case Number 23-0077.*

### **9. Probabilistic Choice Induced by Strength of Preference.**

Dan Cavagnaro (Cal State Fullerton). Contact: [dcavagnaro@fullerton.edu](mailto:dcavagnaro@fullerton.edu)

**Abstract:** Just as we formulate detailed theories of utility or preference, so too should we theorize carefully about *strength* of preference. Likewise, because behavior is inherently uncertain, we need a theoretical framework for understanding choice probabilities. Linking these two goals, this talk fleshes out the simple premise that more strongly preferred options are more likely to be chosen. The resulting distribution-free Fechnerian models (DFMs) eschew convenience assumptions underlying popular models like the logit and probit, revealing which aspects of a core decision theory do or do not remain invariant across different ways of constructing strengths of preference, as well as across different monotonic links between those strengths of preference and choice probabilities. Through a series of examples, we demonstrate the derivation and geometric characterization of DFMs, and highlight specific cases where DFMs

protect the researcher against mistaken conclusions caused by overspecified models.

**10. A Comparison of Six Models of Salary Satisfaction.**

Michael H. Birnbaum (Cal State Fullerton) & Julien Rouvère (Cal State Fullerton).  
Contact: [mbirnbaum@fullerton.edu](mailto:mbirnbaum@fullerton.edu)

**Abstract:** This article reports a series of studies of judgments of satisfaction with salary, manipulating the distribution of salaries of others doing the same work. The experiments are designed to compare six theories of contextual effects in judgment, including adaptation level theory, correlation-regression theory, inferred distribution theory, decision by sampling, ensemble theory, and range-frequency theory. Manipulations of the frequency distribution using cubic density functions produces a double crossover of curves relating judgments to salaries; this double crossover violates implications of four of the theories. Manipulation of the endpoints produces changes in the heights and slopes of the curves, contrary to decision by sampling and not entirely consistent with ensemble theory. Range-frequency theory is the only theory that gives a consistent account of all of the results. Range-frequency theory can be extended in order to estimate the effective context, which appears to differ systematically between people according to their full-time incomes.

**11. Center-Surround, Chimeric Face Processing, Picnics on Islands, and Tori.**

Donald G. Saari (UC Irvine) & Louis Narens (UC Irvine). Contact: [dsaari@uci.edu](mailto:dsaari@uci.edu)

**Abstract:** Consider the mystery where an action involves two or more variables, but one of them dominates the outcome. With certain activities, for instance, the left or the right side of the brain plays a stronger role in reaching a conclusion. The model discussed here explains this behavior for a class of settings that includes the well-known center-surround color phenomenon, an ethic's issue concerning group decisions, and the processing of emotions displayed on a chimeric face. The explanation involves the geometry of a torus, which resembles the surface of a donut. Also described is the wild activity that can accompany a switch between which variable is dominant: a characterization that is consistent with empirically observed behavior in center-surround experiments.