
The relationship between the framing of risks and the perceived value of a choice has been thoroughly demonstrated within psychology and behavioral economics. Daniel Kahneman and Amos Tversky’s (1979, also Tversky and Kahneman, 1981) research has established, for example, that individuals become risk-seeking when choices are framed as potential losses as opposed to potential gains, even when expected values are identical. Advances in financial risk management, in particular the development of highly sophisticated quantitative analytical methods, have made significant changes to how risk is framed within financial organizations. The aim of this research is to understand how these quantitative analytics have framed risk and influenced organizational decision making, especially risk taking.

As many commentators on the recent financial crisis have observed, financial innovation has increased the complexity of financial models, fostered optionality, and brought about greater precision in risk estimation. The first phase of proposed research, which is being submitted for potential funding, aims to understand how quantitative analytics, specifically through increased complexity, affect individual risk-taking behavior. Research in second phase aims to understand how the optionality and increased precision brought about through quantitative finance also affected risk perceptions. Both Phase I and Phase II are motivated by the belief that financial innovation must take into account human factors in the development of financial models and technology to avoid situations like the current credit crisis. To do this, we must understand how the framing of choices through the use of quantitative analytics has influenced risk-taking behaviors; this proposal takes a step in this direction.

**Phase I: Individual Risk-Taking Behavior and Model Complexity**: The development of sophisticated and increasingly complex risk modeling methods has been widely blamed for the financial crisis by finance insiders, policy makers, and academics, but what exactly is the relationship between complexity and risk-taking? Through a series of experiments (using the Xlab), this research project will investigate whether risk information conveyed with highly-complex mathematical models results in greater risk acceptance than when identical information is conveyed using simpler (but mathematically identical) models. This research aims to advance the theoretical understanding of framing effects on risk-taking from *what* is conveyed in descriptions of risk (e.g. gains and losses) to *how* information is conveyed in descriptions of risk.

**Phase II: Individual Risk-Taking Behavior, Optionality, and Precision**: The development of quantitative risk analytics has given traders and investors more and more options for managing their risk profiles and increased the precision of risk estimates. Aside from the inherent-level of risk within financial products and the risk-reducing effects of diversification and large numbers, what effect has the increased number of options had on risk-taking behavior? Do individuals who make a risky choice out of a greater set of options take greater risks than individuals who make a choice out of fewer options? Second, do precise estimates (regardless of their accuracy) lead to a heightened sense of understanding of probabilities and ultimately to greater risk-taking? To answer these questions, we propose designing a trading-like computer game that will present experimental subjects with different levels of optionality and precision to examine their effects on their risk acceptance.
Regulators, financial experts, and academics seeking an explanation for the credit crisis have pointed their fingers at the increased complexity of finance brought about through innovation and advanced quantitative methodologies. Federal Reserve Chairman Ben Bernanke, for example, has warned that complexity poses dangers to the financial system: "Although financial innovation promotes those objectives in some ways, for example by allowing better sharing of risks, certain aspects of financial innovation—including the complexity of financial instruments and trading strategies...—may pose significant risks. These risks should not be taken lightly" (2007). Although complexity has been viewed with suspicion, there is little empirical evidence about whether complexity "may pose significant risks" and the claim that complexity has played a role in the current financial crisis has not been substantiated empirically.

Academic literature on risk-taking has demonstrated that how risks are framed can have shape individual responses in ways that are not consistent with rational actors seeking to maximum expected value. Kahneman and Tversky have noted that framing similar bets in terms of gains or losses will impact their perceived value and framing gambles with identical expected values in terms of certain or uncertain gains (and losses) will also shape their value (1979). Their subjects, for example, chose smaller certain gains over much larger but uncertain gains with larger expected values (Tversky and Kahneman, 1981). These studies and subsequent work on decision framing suggest that how risks are framed can have significant impacts on whether they are taken. While the research on risk framing has often looked at what information is included or excluded within frames, it has stopped short of developing an understanding of how information is conveyed. Recent research on how numerical and verbal probabilities are perceived differently (e.g. Budescu et al., 2009; Olson and Budescu, 1997) and on the effects of precision on confidence (Budescu and Templin, 2008) suggest that how information is conveyed is often as critical to decision making as what information is conveyed. Although the same information may be presented, the style in which it is presented may also influence risk taking. This suggests that portraying information through complex models may also influence risk taking.

The overall research question for this project is this: Are risks framed within complex models more or less likely to be accepted than risks without complex framing? If our research finds that complexity does shape risk-taking behaviors (our preliminary studies suggest that complexity does have these effects), are there ways of mitigating the potentially irrational effects of complexity on decision making? For example, does mathematical training increase or decrease risk-taking under complexity? Does transparency regarding the availability of data and the kinds of assumptions inherent in analysis mitigate potential "complexity biases"?

We have conducted one very preliminary survey that suggests that this research stream may provide useful insights into the effects of complexity on risk-taking decisions. We distributed a scenario-type survey to a class of management students in the Masters in Business Administration program and finance students in the Masters in Financial Engineering who were all taking a behavioral finance class. We employed a 2X2 between-subjects design so that half the management students and half of the finance students received a survey with complex models and the other students received a survey with simple models.
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In the simple version of one scenario, students were asked to pretend that they were acting as the director of a fund of funds and had a one-time opportunity to invest up to $10 million in a particular venture fund. The subjects were told that the chief risk officer (CRO) had analyzed the fund and determined that there was a 51 percent chance of doubling the investment and a 49 percent chance of losing the investment. They were also told that the CRO had used the following formula for generating the rate of return:  

\[ E(R_i) = R_f + \beta_1(E(R_m) - R_f) \]

In the complex condition, students were given the same information, but were told that the CRO had used this formula for generating the rate of return:  

\[ E(R_i) = R_f + \frac{[E(R_iR_m)E(R_m) - E(R_i)E(R_m)R_f - E(R_i)E(R_m)E(R_m) + E(R_i)E(R_m)R_f]}{E(R_m^2) - E(R_m)^2} \]

The simple and complex equations are mathematically identical. The complex one can be reduced to the simple one. In both cases, risk-taking was measured by the total amount subjects said they would invest.  

Although this study is extremely preliminary and could be improved in many ways (for example, using less familiar equations and removing familiarity as a potential confound), regression analysis suggested that there was a significant difference at the 95 percent between risk taking in the different conditions and a statistically significant different between management and finance students. Overall, students were more likely to invest in the complex model. However, management students were more likely to invest when provided with a complex model but finance students were less likely to invest when provided with a complex model. Significantly, finance students were less likely to invest when they were given complex models even when the expected utility of a risk was positive and large. In fact, the finance students seemed to be making potentially negative business decisions by becoming too risk adverse. Management students, on the other hand, seemed to become overly risk-seeking when exposed to complex models.  

As we have mentioned, this study is extremely preliminary. We are applying for this grant to fund further development of this research through more thorough testing of the effects of complexity on risky decisions. We aim to make our studies more methodologically rigorous, more theoretically significant, and more meaningfully applicable to real world risk taking decisions.  

Our first priority is to run experimental studies in the more controlled environment of Berkeley's XLab, rather than in a large classroom setting where subjects could possibly see other’s papers and even communicate with each other (furthermore, students may have been influenced by their perception of the experimenter who was also an instructor for the course). Our budget includes funding to recruit and run subjects through Xlab, which would be much less problematic of recruiting subjects (in the preliminary study, subjects were self-selected into a behavioral finance class).
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We also aim to look at different kinds of complexity. In the preliminary study, the only complexity was the model, which subjects did not actually need to make a decision. Ideally, we could also test procedural complexity: what happens when making a decision requires a more complicated process rather than just more complex information? We may also test the effects of complexity on trust: do more complicated methodologies make decisions more or less prone to auditing and reconsideration? Addressing these questions will enable us to tie our findings to the multiple forms of complexity that quantitative analytics have created within financial institutions.

Finally, we also seek to include in our study designs tests of potential methods to mitigating “complexity biases,” if they exist. Although a more thorough understanding of how complexity influences risk taking may itself create an awareness of potential hazards of dealing with complex quantitative analytics, our research will be most valuable if we also empirically test potential ways of dealing with the deviations from rationality where we find them to exist. For example, we could test whether increased mathematical training reduces (or increases) the effects of complexity, whether accountability or greater financial rewards reduces (or increases) the effects of complexity, and whether increased transparency about complex models reduces (or increases) any effects we might find. This part of our research is not yet fully defined because it will hinge on what kinds of effects we find for complexity and the psychological mechanisms through which these effects operate.

Although the subject of our research is complexity, the research itself should be simple and straightforward and a working paper with its results (and hopefully, a publishable submission) should be finished within the coming academic year. Our primary activities, which would be funded through the grant, would be amending our current protocol with the Committee on Protection of Human Subjects, designing experiments, recruiting subjects, and running experiments in XLab as well as reporting our findings in publishable papers.

We believe that this research will make several important contributions to the academic literature on risk-taking as well as have practical implications for individuals involved in risk management and the quantitative assessment of risk. Academically, this research will push the current literature toward an overlooked aspect of risk decision making, complexity. Theoretically, it will advance our understandings from what is conveyed about risk (e.g. gains or losses) but also how risk is conveyed (simply or complexly). Furthermore, it will add to the external validity of the academic work on risk framing. Although risk framing has been shown to have significant effects in the lab, risk decisions are rarely presented as clearly and simply in real world scenarios. By understanding how complexity changes risk decision making, we can understand more clearly how the simple results of lab studies and surveys may be translated in complex, real world situations.

Our research also addresses the need for more applied (but equally rigorous) research on risk management practices and the effects of the use of quantitative analytics on risk taking. Complexity has become a fact of life within financial risk management. Understanding how it shapes daily decision making may enable risk managers and other professionals to guard against cognitive biases that may result in suboptimal practices.

Phase II:

Increased complexity is just one of the many ways financial innovations in risk management have changed how decisions are framed within finance. In the future, our research may be extended to
include other important ways in which risk frames have changed including increased optionality and greater precision in estimates. We envision creating Xlab experiments in which subjects, like traders in today's markets who are flooded with investment products and options, are given many options to choose from when picking gamble-type risks. Although diversification can reduce risks when individuals choose more than one investment product, there may be an illusion of diversification created when individuals have many options, but only ultimately get to pick one option. Precision is another potential factor in how risk is perceived. We hypothesize that precise estimates can create an illusion of a greater understanding of the underlying risk such that individuals may demonstrate greater overconfidence and risk taking when given precise information, despite the trade-off between precision and accuracy. These proposed extensions of our research are extremely preliminary and will be informed by Phase I research on complexity and risk taking. We hope to apply for funding for Phase II in 2010.
Citations


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ACADEMIC POSITIONS HELD
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RESEARCH INTERESTS
Organizational legitimacy; Symbolic management; Impression management; Stigma, status and reputation
Social movements; Institutional change
Organizational ecology
Corporate governance

EDUCATION
Northwestern University, Evanston, Illinois
PhD in Management and Organizations, Kellogg School of Management, 2007
Advisors: Edward J. Zajac, Hayagreeva Rao
New York University, New York, New York
MBA in Management and Finance, Leonard N. Stern School of Business, 2001
Johns Hopkins University, Washington, D.C.
MA in Eastern European Studies and International Economics, Nitze School of Advanced International Studies, 1997
Georgetown University, Washington, D.C.
BSFS in International Economics, 1994
PEER-REVIEWED PUBLICATIONS


INVITED PUBLICATIONS


WORKING PAPERS

Jo-Ellen Pozner. Stigmatization or Scapegoating? Explaining Turnover Following Restatements.


Jo-Ellen Pozner. Power and Symbolic Management Following Earnings Restatements.


Tina Dacin, Jo-Ellen Pozner, and Michaela DeSoucey. Profits for Prophets: Invisibility in Organizational Life.

Ithai Stern and Jo-Ellen Pozner. Organizational Size, Performance and Frequency-Based Imitation: A Test of Competing Hypotheses.

WORK IN PROGRESS

Jo-Ellen Pozner and Emily Block. Institutional Innovation and Multi-Stakeholder Dynamics in the U.S. Television Industry.

Jo-Ellen Pozner, Colleen Stuart and Celia Moore. Legitimating Effects of Stigmatizing Actions.

Nydia MacGregor and Jo-Ellen Pozner. Chain Building: Community and Organizational Form in Retail.


Paul Hirsch, Jo-Ellen Pozner and Mary Kate Stimmler. Deregulation of Financial Institutions.


INVITED PRESENTATIONS

Symbol or Signal? 2009. Joint Colloquium, McIntyre School of Commerce and Darden School of Business, University of Virginia.


REFERRED PRESENTATIONS


Profits for Prophets: Invisibility in Organizational Life (with Tina Dacin and Michaela DeSoucey). 2008. European Group for Organizational Studies, Amsterdam, the Netherlands.


**TEACHING**

Haas School of Business, University of California, Berkeley

MBA205L: Leadership

PHDBA 259S: OBIR Colloquium

Northwestern University

MORS 470: Negotiation Strategies

Conceptual Issues in Management: Leading High-Impact Teams

**HONORS AND AWARDS**


Best Symposium Award, OMT Division, Academy of Management, 2007.


Booz Allen Hamilton/SMS PhD Fellow, Strategic Management Society, 2005.

Alumnae Club Key Pin Award, New York University, 2001.
New York University President’s Service Award, 2001.
Stern School of Business Service Award, 2001.
Member, Beta Gamma Sigma Honor Society.
Michael Krupensky Award for Russian Studies, Georgetown University, 1994.

RESEARCH GRANTS
Institute for Research on Labor and Employment, University of California, Berkeley, Research Support Award, 2008-09.
University of California Committee on Research, Faculty Research Grant, 2008-09.
University of California Committee on Research, Research Assistantship in the Humanities Grant, 2008-09.
University of California Committee on Research, Faculty Research Grant, 2007-08.
University of California Committee on Research, Research Assistantship in the Humanities Grant, 2007-08.
Clogg Scholarship Award (Sociology), ASA Sociology Methods Section and the Inter-University Consortium for Political and Social Research, June 2004.
Pew Fellowship for the Study of International Diplomacy, School of Foreign Service, Georgetown University, 1993-94.

MEDIA MENTIONS
http://sanfrancisco.bizjournals.com/sanfrancisco/stories/2008/07/14/daily78.html
KPFA Morning Show (on-air interview), June 23, 2008.

PROFESSIONAL SERVICE
Editorial Review Board Member, Organization Science, 2008 - present
Ad Hoc Reviewer
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Academy of Management Journal  
Academy of Management Review  
Administrative Science Quarterly  
American Journal of Sociology  
California Management Review  
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TEACHING EXPERIENCE
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Haas@Work
Creative team facilitator for workshops with MBAs at Visa, Wells Fargo, Disney

2009
MFE230: Behavioral Finance
Graduate Student Instructor for Lecturer Greg Lablanc

2007
EW MBA 205: Organizational Behavior
Graduate Student Instructor for Professor Barry Staw

2007
UGBA 105: Organizational Behavior
Graduate Student Reader for Professor Karlene Roberts

PROFESSIONAL EXPERIENCE
2008-Present
Research Assistant, Russell Sage Foundation, Berkeley, CA
Assisting Neil Smelser and John Reid in background research for their book on usable social sciences.

2007-2008
Research Assistant, UC Berkeley and Wildfire Lessons Learned Center, Tuscon, AZ
Assisted team of international researchers and practitioners in evaluating the reliability of elite firefighting teams.

2000-2008
Freelance Writer and Editor
Wrote wide variety of articles, reports and Web content for economic development agencies (Japanese Economic Trade Relations Organization, British Midlands Development Corporation, Swiss Organizational for Facilitating Investments), consulting firms (Milliman, Unversum), publishers (WetFeet, InnovationWORLD), and NGOs (WILPF, Association for Progressive Communication).

2005-2006
Research Fellow, Level Playing Field Institute, San Francisco, CA
Conducted research on the retention of minority employees at large corporations.

2000- 2003
Researcher, University of Chicago, Chicago, IL
Executed research funded by National Institutes of Health on history of truth serum.

2000-2002
Writer, Office of Public Information, Minnesota Senate, St. Paul, MN
Wrote policy reports for the weekly Senate Briefly and annual Perspectives magazines.