

---

Electronic Theses and Dissertations, 2004-2019

---

2015

## Three Studies Examining the Effects of Psychological Distance on Judgment and Decision Making in Accounting

Martin Weisner  
*University of Central Florida*

 Part of the [Accounting Commons](#)

Find similar works at: <https://stars.library.ucf.edu/etd>

University of Central Florida Libraries <http://library.ucf.edu>

This Doctoral Dissertation (Open Access) is brought to you for free and open access by STARS. It has been accepted for inclusion in Electronic Theses and Dissertations, 2004-2019 by an authorized administrator of STARS. For more information, please contact [STARS@ucf.edu](mailto:STARS@ucf.edu).

---

### STARS Citation

Weisner, Martin, "Three Studies Examining the Effects of Psychological Distance on Judgment and Decision Making in Accounting" (2015). *Electronic Theses and Dissertations, 2004-2019*. 1316.  
<https://stars.library.ucf.edu/etd/1316>

THREE STUDIES EXAMINING THE EFFECTS OF PSYCHOLOGICAL DISTANCE ON  
JUDGMENT AND DECISION MAKING IN ACCOUNTING

by

MARTIN M. WEISNER

B.S.B.A. University of Nevada, Las Vegas, 2001  
M.B.A. Thunderbird School of Global Management, 2008

A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy  
in the Kenneth G. Dixon School of Accounting  
in the College of Business Administration  
at the University of Central Florida  
Orlando, Florida

Spring Term  
2015

Major Professor: Steve G. Sutton

## **ABSTRACT**

This dissertation comprises three studies, a literature review and two experimental studies, that center on the effects of psychological distance on judgment and decision-making in accounting. Construal level theory (CLT) of psychological distance (Liberman and Trope 1998; Trope and Liberman 2003), a framework recently developed in the field of social psychology, constitutes the theoretical foundation for each study.

The first study reviews extant literature on CLT and illustrates the theory's potential for investigating previously unexplained phenomena within the accounting domain. Selected publications that apply CLT in contexts that are of particular interest to accounting researchers are emphasized and a series of broad, CLT-based research questions pertaining to various accounting domains are offered. The second study applies CLT to the audit context by investigating whether the performance of common auditing tasks that require varying degrees of abstract thinking affect decision-makers' overall mindset and hence their subsequent judgment. Results from the second study have important implications for audit practice as auditors work in environments that require frequent shifts in focus due to multiple client or project demands. The third study applies CLT to the enterprise risk management context by examining how spatial distance from a risk assessment object and risk category (i.e., the type of risk) affects decision-makers' assessment of the probability that the risk will materialize. The third study thus informs the corporate governance literature by identifying psychological distance as a potential source for judgment bias during the risk assessment process.

Overall, the results reported in this dissertation suggest that psychological distance systematically affects individuals' judgment subject to the caveat that the judgment of concern

falls within the domain of the decision-maker's routine cognition. By presenting empirical evidence from both the audit and the risk management domain, the studies contribute to our understanding of the heuristics and biases in judgment and decision-making in professional settings that are of interest to accounting research.

## **ACKNOWLEDGMENTS**

Completion of this dissertation would not have been possible without considerable assistance and support from numerous individuals. I would like to express my gratitude to my committee members, Vicky Arnold, Sean Robb and Bill Messier for their helpful feedback, support and patience throughout the entire dissertation process. Most importantly, I would like to thank my dissertation chair, Steve Sutton, who guided and inspired me ever since I entered the Ph.D. program. Both Steve and Vicky have been phenomenal mentors and academic role models. Any accomplishments in my future academic career are due to their inspiration, guidance and continued support.

Faculty members who provided critical assistance with my data collection efforts are Anthony Amoruso, Darryl Allen, David Donnelly, Jeffrey Reinking, Kristina Demek, Lisa Baudot, and Steven Hornik. I would like to thank them for their time and support and feel privileged to consider them all my colleagues. I am also grateful to Margaret Clark for her guidance throughout the statistical analysis process, to Yaacov Trope for providing a critical experimental instrument, to Cheryl Wakslak for providing invaluable advice, and to the Institute of Management Accountants (IMA) for financial support.

Lastly, I am grateful to doctoral students who offered insightful suggestions and facilitated the recruitment of participants for my experiments. Specifically I would like to thank Amy Donnelly, Anis Triki, Bonnie Brown, Bradley Lang, Irina Malaescu, Jared Eutsler, Jared Koreff, Kazeem Akinyele, and Leif Bang.

## TABLE OF CONTENTS

LIST OF FIGURES .....	ix
LIST OF TABLES .....	x
GENERAL INTRODUCTION.....	1
Study One: Using Construal Level Theory to Motivate Accounting Research: A Literature Review.....	2
Study Two: The Impact of Construal Mindset Orientation on Auditors’ Probability Assessment .....	4
Study Three: The Impact of Spatial Distance and Risk Category on Probability Assessment ...	6
Overall Contribution .....	7
References .....	9
STUDY ONE: USING CONSTRUAL LEVEL THEORY TO MOTIVATE ACCOUNTING RESEARCH: A LITERATURE REVIEW .....	
Introduction.....	11
Basic Research on Construal Level Theory .....	16
Selected Applications of Construal Level Theory .....	25
Research on Temporal Distance .....	25
Research on Spatial Distance .....	29
Research on Social Distance.....	31
Research on Hypotheticality.....	32
Overall Mindset Implications of Psychological Distance .....	33
CLT-Informed Accounting Research .....	38
Implications for Accounting Research .....	42
Accounting Information Systems (AIS).....	44
Audit .....	45

Financial and Managerial Accounting.....	47
Tax.....	52
Conclusion.....	53
References.....	55
Tables.....	64
STUDY TWO: THE IMPACT OF CONSTRUAL MINDSET ORIENTATION ON AUDITORS' PROBABILITY ASSESSMENT.....	85
Introduction.....	85
Background.....	90
Theory and Hypotheses.....	94
Research Method.....	103
Overview.....	103
Independent and Dependent Variables.....	104
Experiment 1.....	105
Participants.....	105
Experimental Procedures.....	107
Manipulation Checks.....	113
Debriefing Questions.....	113
Results.....	114
Experiment 2.....	119
Participants.....	119
Experimental Procedure.....	121
Debriefing Questions.....	124
Results.....	124
Additional Analyses.....	128
Supplemental and Exploratory Measures.....	132

Conclusion.....	139
References .....	143
<b>STUDY THREE: THE IMPACT OF SPATIAL DISTANCE AND RISK CATEGORY ON PROBABILITY ASSESSMENT.....</b>	<b>146</b>
Introduction .....	146
Background .....	153
Theory and Hypotheses .....	162
Experiment 1 .....	173
Participants .....	174
Experimental Procedures .....	176
Manipulation Checks .....	177
Debriefing Questions .....	178
Results .....	178
Experiment 2 .....	180
Participants .....	181
Experimental Task.....	184
Independent and Dependent Variables .....	185
Manipulation Checks .....	188
Debriefing Questions .....	189
Results .....	190
Additional Analyses .....	193
Conclusion.....	198
References .....	202
<b>GENERAL CONCLUSION .....</b>	<b>209</b>
References .....	215
<b>APPENDIX A: STUDY 2 - EXPERIMENT 1: CASES AND QUESTIONNAIRE .....</b>	<b>216</b>



Condition 1: Abstract / Event.....	217
Condition 2: Abstract / Complement .....	233
Condition 3: Concrete / Event.....	249
Condition 4: Concrete / Complement .....	266
APPENDIX B: STUDY 2 – EXPERIMENT 2: CASES AND QUESTIONNAIRE.....	283
Condition 1: Abstract / Event.....	284
Condition 2: Abstract / Complement .....	294
Condition 3: Concrete / Event.....	304
Condition 4: Concrete / Complement .....	314
APPENDIX C: STUDY 3 – EXPERIMENT 1: CASES AND QUESTIONNAIRE.....	324
Condition 1 – Likely Risk.....	325
Condition 2 – Unlikely Risk .....	331
APPENDIX D: STUDY 3 – EXPERIMENT 2: CASES AND QUESTIONNAIRE.....	337
Condition 1: Proximate / Operational .....	338
Condition 2: Proximate / Non-Operational .....	351
Condition 3: Remote / Operational .....	364
Condition 4: Remote / Non-Operational .....	377
APPENDIX E: IRB APPROVALS .....	390

## LIST OF FIGURES

Figure 1: Overview of Construal Level Theory.....	18
Figure 2: Expected Results - H1 .....	100
Figure 3: Expected Results - H2 .....	102
Figure 4: Experimental Procedures - Experiment 1.....	112
Figure 5: Estimated Means - Experiment 1: H1 .....	115
Figure 6: Estimated Means - Experiment 1: H2 .....	117
Figure 7: Experimental Procedures - Experiment 2.....	123
Figure 8: Estimated Means - Experiment 2: H1 .....	125
Figure 9: Estimated Means - Experiment 2: H2 .....	126
Figure 10: Risk Assessment Process.....	161
Figure 11: Illustrative Risk Map.....	162
Figure 12: Expected Results - Experiment 2 .....	173
Figure 13: Estimated Marginal Means - Experiment 2.....	191

## LIST OF TABLES

Table 1: Basic CLT Research & Related Syntheses .....	64
Table 2: Temporal Distance Research .....	68
Table 3: Spatial Distance Research.....	73
Table 4: Social Distance Research.....	75
Table 5: Hypotheticality Research.....	77
Table 6: Construal Mindset Orientation Research.....	78
Table 7: CLT-Informed Accounting Studies .....	83
Table 8: Demographics - Experiment 1 .....	106
Table 9: Experimental Conditions - Experiment 1 .....	112
Table 10: Results - Experiment 1: H1.....	115
Table 11: Results - Experiment 1: H2.....	119
Table 12: Demographics - Experiment 2 .....	120
Table 13: Experimental Conditions - Experiment 2 .....	123
Table 14: Results - Experiment 2: H1.....	125
Table 15: Results - Experiment 2: H2.....	127
Table 16: Post-hoc Tests .....	130
Table 17: Additional Questions .....	135
Table 18: Demographics - Experiment 1 .....	175
Table 19: Results - Experiment 1.....	180
Table 20: Demographics - Experiment 2 .....	183
Table 21: Risk Factors - Experiment 2 .....	187

Table 22: Results - Experiment 2.....	192
Table 23: Individual Risk Factors - Experiment 2.....	194
Table 24: Additional Analyses - Experiment 2: Macroeconomic Risk Factors .....	195
Table 25: Additional Analyses - Experiment 2: Strategic Risk Factors .....	197

## GENERAL INTRODUCTION

Construal level theory (CLT) of psychological distance (Liberman and Trope 1998; Trope and Liberman 2003) has been recognized as a prominent contemporary social psychology theory and comprehensive framework for judgment and decision-making that shows potential to further the growing academic inquiry into behavioral decision theory and social cognition (Fiedler 2007). The three studies incorporated in this dissertation are built around this theory.

According to CLT, the notion of psychological distance signifies a mutual meaning shared by four related distance dimensions: temporal distance, social distance, spatial distance, and hypotheticality (i.e., distance from actuality). The fundamental idea is that psychological distance is tied to the level of mental construal (i.e., mental representation) such that more distant objects (or situations) are construed at a higher level and higher-level construals evoke thoughts of more distant objects (Trope and Liberman 2010). Simply stated, whenever individuals direct their thoughts at something (or someone) that exists outside their *direct* experience (i.e., not *here* and *now*), the process of *abstraction* is used to extract the core meaning and central aspects of whatever one thinks about (Trope and Liberman 2010). According to CLT, the extent to which abstraction is employed is affected by the degree to which thoughts are directed away from one's *direct* experience. As a consequence, individuals are said to have adopted either an abstract mindset orientation (i.e., abstract or high-level construal; abstract thinking) or a concrete mindset orientation (i.e., concrete or low-level construal; concrete thinking). CLT further suggests that mental construals influence evaluation, prediction, and behavior (Trope et al. 2007).

This research comprises three separate studies, a literature review and two experimental studies, all centered on the insights derived from CLT. The first study reviews the extant CLT

literature and offers broad, CLT-based research questions pertaining to various accounting domains. The second study applies CLT to the audit context by investigating whether the performance of common auditing tasks that require varying degrees of abstract thinking affect decision-makers' overall mindset and hence their subsequent judgment. The third study applies CLT to the enterprise risk management (ERM) context by examining how spatial distance from a risk assessment object and risk category (i.e., the type of risk) affects decision-makers' risk assessment. The following subsections provide additional detail on each chapter by highlighting the underlying motivation for each study, the research method employed, and the contributions of each study to the accounting literature. The overall contribution of this dissertation is summarized in the last subsection.

#### Study One: Using Construal Level Theory to Motivate Accounting Research: A Literature Review

The central argument of Study One is that CLT provides the potential for a better understanding of the heuristics and biases in judgment and decision-making that are associated with decision environments in which judgments are influenced by, or focused on, either: (1) temporal distance (i.e., thoughts about the future or the past); (2) spatial distance (i.e., thoughts about geographically remote locations); (3) social distance (i.e., thoughts about other individuals); (4) hypotheticality (i.e., consideration of hypothetical, rather than actual situations or events); or a combination of (1) – (4). To this end, Study One provides a detailed review of extant CLT literature with an emphasis on publications that apply the theory in contexts that are of particular interest to accounting researchers. CLT's underlying theoretical logic is explained and commonalities and differences between CLT and related or competing theories in terms of their prediction and focus are highlighted.

Findings from the reviewed literature point toward converging support for the CLT proposition that psychological distance, effected through temporal distance, spatial distance, social distance, or through hypotheticality, affects decision-makers' predictions (e.g., correspondence bias; prediction confidence), evaluations (e.g., differential weighting of *primary* versus *secondary* features; *desirability* versus *feasibility* concerns; *pro* versus *con* considerations), and behavior (e.g., logrolling willingness in negotiation; performance on abstract vs. concrete tasks; susceptibility to the sunk-cost bias). Furthermore, CLT research suggests that the identified effects are mediated by the degree of *abstractness* with which decision-makers mentally present the objects, persons, situations, or events that are the focus of their decision.

Given those findings, it is argued that CLT's focus on mediating cognitive mechanisms should offer accounting researchers the opportunity to gain a deeper understanding of how accounting professionals, organizational actors, and other decision-makers who rely on accounting information predict situations, express preferences, evaluate situations, or act upon considerations that encompass varying degrees of psychological distance. It is further argued that the predictions and insights provided by CLT warrant exploration by behavioral accounting researchers as accounting, auditing, and business in general becomes increasingly global and geographically dispersed. To facilitate such inquiry, 23 broad research questions related to various accounting disciplines are put forward.

By explaining the core tenants of CLT through a review of selected studies that are of particular interest to accounting researchers and by highlighting commonly applied methods associated with experimental manipulations, Study One motivates behavioral accounting researchers to consider CLT as a basis for exploring critical research questions in the judgment

and decision-making domain. As such, the study elaborates on the theoretical foundation for Study Two and Study Three and contributes, more generally, to the accounting literature by identifying avenues for future inquiry.

### Study Two: The Impact of Construal Mindset Orientation on Auditors' Probability Assessment

Study Two applies CLT to the audit context. The experimental study explores the effects of task-induced mindset on subsequent decisions in a multi-task, multi-client environment in which auditors perform dissimilar tasks for different clients within a short period of time.

Research on the effects of task and client sequencing on auditor decisions (e.g., Lindberg and Maletta 2003; O'Donnell and Schultz, Jr. 2005; Bhattacharjee et al. 2007, 2013) has identified undesirable carryover effects as a common form of information processing and recall-related errors. Those studies provide converging evidence that working, within a short period of time, on multiple tasks for the same client or on similar tasks for multiple clients affects auditors' judgments. However, the arguably more ubiquitous situation in which an auditor needs to render judgments associated with successive tasks that are entirely unrelated (i.e., different client *and* dissimilar task) has largely been ignored. Accordingly, Study Two focuses on such a scenario by investigating whether the performance of common auditing tasks that require varying degrees of abstract thinking affect auditors' overall mindset and hence their subsequent judgment.

Two experiments, each following a  $2 \times 2$  between-subjects design are conducted. Each experiment involves two separate and completely unrelated tasks. The first task (Task 1) differs between Experiment 1 and Experiment 2 while the second task (Task 2) remains the same (i.e., an accounts receivable task that calls for a probability assessment related to an outstanding balance). The two independent variables for both experiments are *construal mindset* (abstract vs.



concrete) and *focus of the probability assessment question* (collectible vs. uncollectible; that is, *how* the probability question is asked). Experiment 1 manipulates construal mindset by asking experienced auditors to complete an audit task that requires either a high-level, abstract perspective or a low-level, concrete perspective. Experiment 2, which uses accounting students as participants, manipulates construal mindset via a priming task developed in the psychology literature. The dependent variable, which is captured in Task 2, is participants' *probability assessment* concerning the ability of an audit client to collect a customer's accounts receivable balance.

Results from both experiments are mixed. Auditors who adopt an abstract mindset orientation as a result of an unrelated preceding audit task, compared to those who adopt a concrete mindset orientation, provide lower probability assessments as predicted. However, no support is found for the hypothesized interaction between construal mindset orientation and focus of the probability question. Moreover, neither the predicted main effect for construal mindset nor the predicted interaction effect is found to be significant for student participants. Results from additional analyses suggest that the probability-related predictions derived from CLT may be limited to situations in which the judgment of concern is relatively familiar to the decision-maker in terms of decision domain and how the judgment question is posed.

By illustrating that task sequencing can affect judgment in the absence of *any* meaningful relationship between an earlier task and a latter one the study closes a research gap in the accounting literature and offers initial insights into the consequences of task abstractness on subsequent judgments that are important for further investigations into post-evaluative behavior.

### Study Three: The Impact of Spatial Distance and Risk Category on Probability Assessment

Study Three applies CLT to the enterprise risk management (ERM) context by examining how spatial distance from a risk assessment target (i.e., an object that is evaluated with respect to the risks it faces) and the nature of the risk under consideration (i.e., risk category or risk type) affects decision-makers' assessment of the probability that the risk will materialize. As such, the study is motivated by a COSO-commissioned research study which highlights the importance of identifying factors that may introduce judgment bias in board decisions (KPMG 2012) and by academic calls for research on risk assessment tools such as risk maps for which probability judgments constitute a core criteria for visualizing the organizational risk landscape (Jordan et al. 2013). Additional motivation for Study Three originates from recent survey research which suggests that corporate board members would like to receive more information about actual ERM processes - including procedures related to the estimation of *risk probability* (see Ballou et al. 2011). The experimental method employed in Study Three addresses this concern.

An experiment is conducted in which participants are asked to predict whether a highly likely risk or a highly unlikely risk, depending on experimental condition, is going to materialize at a proximate or remote location. Contrary to expectations derived from CLT, the results do not suggest that individuals intuitively associate the occurrence of low-probability risks with distant locations and the occurrence of high-probability risks with proximate locations. A possible explanation for this finding is that the requested judgment may have fallen outside the M.B.A. participants' area of expertise and thus outside their routine cognition.

In a second experiment, both spatial distance and risk category are manipulated. Experiment 2 follows a  $2 \times 2$  between-subjects design and uses professional risk managers as participants. The independent variables are *spatial distance* (proximate vs. remote) and *risk*

*category* (operational vs. non-operational). The dependent variable is participants' probability assessment concerning the occurrence of five critical risk factors identified by a recent risk management survey conducted by Protiviti Inc. and North Carolina State University's ERM Initiative (see Protiviti 2014a). As predicted, the results show that risk managers who evaluate a spatially remote object assess the probability that various risk factors will materialize to be lower than those who evaluate a spatially proximate object. Moreover, risk managers provide lowest probability estimates when assessing a non-operational risk factor for a spatially remote object. Additional analyses reveal that risk managers perceive operational risk factors as more likely to occur than strategic risk factors, but not more likely than macroeconomic risk factors.

The study contributes to the corporate governance literature by identifying psychological distance as a potential source for judgment bias during the risk assessment process. It also informs designers of risk registers and centralized risk databases about the potential impact of *risk description abstractness* – which is associated with various risk categories – on probability judgments.

### Overall Contribution

Even though CLT is considered a prominent contemporary theory and comprehensive framework for judgment and decision-making (Fiedler 2007), behavioral accounting research, with few exceptions, has largely ignored the theory's predictions and insights. The three studies reported in this dissertation are centered on the propositions offered by CLT. Combined, the three studies aim at making CLT more accessible to behavioral accounting researchers by providing a detailed explanation of the key insights from CLT (Study One) and by illustrating how those insights can be applied to various accounting settings (Study Two and Study Three).

To achieve the latter goal, CLT is used to predict judgment and decision-making outcomes in both audit and risk management settings.

Results from Study Two and Study Three support several, but not all, predictions derived from CLT. Overall, the studies show that psychological distance (or, more broadly, construal mindset orientation) affects decision-makers' judgment as long as the judgment of concern is relatively familiar to the decision-maker, thus permitting routine decision-making. Although both studies are concerned with professional decision-makers' probability assessments and thus inform the literature on probabilistic judgment, the conceptual implications of those judgments are quite different. Probability judgments in Study Two constitute a specific manifestation of the overall behavioral implications associated with the adoption of an abstract or concrete mindset orientation. Judgments other than those related to probabilities could have been explored and thus could potentially have informed the audit literature about the effects of mindset orientation on auditors' decision-making. In contrast, probability assessment was the core focus of Study Three in which professional decision-makers' judgment with respect to risk-related probabilities constitutes a key decision that, combined with organizational impact assessment, reflect the most prominent criteria used in risk management practice (COSO 2004, 2013).

In sum, the three studies presented in this dissertation contribute to our understanding of the heuristics and biases in judgment and decision-making that are associated with distance-affected decision environments, and suggest that CLT has the potential for supporting the investigation of previously unexplained phenomena within the accounting domain.

## References

- Ballou, B., D. L. Heitger, and D. Stoel. 2011. How boards of directors perceive risk management information. *Management Accounting Quarterly* 12 (4): 14-22.
- Bhattacharjee, S., M. J. Maletta, and K. K. Moreno. 2007. The cascading of contrast effects on auditors' judgments in multiple client audit environments. *The Accounting Review* 82 (5): 1097-1117.
- Bhattacharjee, S., M. J. Maletta, and K. K. Moreno. 2013. Auditors' judgment errors when working on multiple tasks and in multiple client environments: A research summary and practice implications. *Current Issues in Auditing* 7 (1): 1-8.
- Committee of Sponsoring Organizations of the Treadway Commission (COSO). 2004. *Enterprise Risk Management – Integrated Framework*. New York, NY: AICPA.
- Committee of Sponsoring Organizations of the Treadway Commission (COSO). 2013. *Internal Control – Integrated Framework*. Executive Summary. Available at: [http://www.coso.org/documents/990025P\\_Executive\\_Summary\\_final\\_may20\\_e.pdf](http://www.coso.org/documents/990025P_Executive_Summary_final_may20_e.pdf).
- Fiedler, K. 2007. Construal level theory as an integrative framework for behavioral decision-making research and consumer psychology. *Journal of Consumer Psychology* 17 (2): 101-106.
- Jordan, S., L. Jorgensen, and H. Mitterhofer. 2013. Performing risk and the project: Risk maps as mediating instruments. *Management Accounting Research* 24 (2): 156-174.
- KPMG LLP. 2012. Enhancing Board Oversight: Avoiding Judgment Traps and Biases. Available at: [http://www.coso.org/documents/COSO-EnhancingBoardOversight\\_r8\\_Web-ready%20\(2\).pdf](http://www.coso.org/documents/COSO-EnhancingBoardOversight_r8_Web-ready%20(2).pdf).
- Liberman, N., and Y. Trope. 1998. The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology* 75 (1): 5-18.
- Lindberg, D. L., and M. J. Maletta. 2003. An examination of memory conjunction errors in multiple client audit environments. *Auditing: A Journal of Practice & Theory* 22 (1): 127-141.
- O'Donnell, E., and J. J. Schultz, Jr. 2005. The halo effect in business risk audits: Can strategic risk assessment bias auditor judgment about accounting details? *The Accounting Review* 80 (3): 921-939.

Protiviti. 2014a. Executive Perspectives on Top Risks for 2014. Available at:  
<http://www.protiviti.com/en-US/Documents/Surveys/NC-State-Protiviti-Survey-Top-Risks-2014.pdf>.

Trope, Y., and N. Liberman. 2003. Temporal construal. *Psychological Review* 110 (3): 403-421.

Trope, Y., and N. Liberman. 2010. Construal-level theory of psychological distance. *Psychological Review* 117 (2): 440-463.

Trope, Y., N. Liberman, and C. Wakslak. 2007. Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior. *Journal of Consumer Psychology* 17 (2): 83-95.

# STUDY ONE: USING CONSTRUAL LEVEL THEORY TO MOTIVATE ACCOUNTING RESEARCH: A LITERATURE REVIEW

## Introduction

Accounting professionals, like all other decision-makers frequently direct their thoughts towards actions, situations, objects, persons, or events outside the realm of their direct experience. That is, they think about the future or the past (e.g., with respect to investment decisions), distant locations (e.g., foreign subsidiaries), other individuals' perceptions or experiences (e.g., supervisors or clients), or hypothetical events rather than actual events (e.g., potential risk factors). They also make plans (e.g., budgets), render judgments (e.g., approve an organizational course of action), and make choices (e.g., decide whether or not a new technology should be adopted) based upon, or influenced by those thoughts (see Liberman and Trope 2008; Trope and Liberman 2010). Construal level theory (CLT) of psychological distance<sup>1</sup> (Liberman and Trope 1998; Trope and Liberman 2003) offers accounting researchers the opportunity to gain new insights into heuristics and biases associated with thoughts and decisions and promises a deeper comprehension of judgment and decision-making in distance-affected decision environments.<sup>2</sup> Such insights, enabled by CLT's focus on cognitive processes, are increasingly relevant as accounting, auditing, and business in general becomes ever more global and geographically dispersed.

---

<sup>1</sup> While early CLT studies focused on the temporal distance effects on preferences and referred to the theory as *temporal construal theory*, this literature review uses the more inclusive term CLT for ease of exposition. This terminological convention is in line with the majority of research published after Trope and Liberman's (2003) seminal article.

<sup>2</sup> Such environments include those in which decisions are influenced by, or focused on, either: (1) temporal distance (i.e., thoughts about the future or the past); (2) spatial distance (i.e., thoughts about geographically remote locations); (3) social distance (i.e., thoughts about other individuals); (4) hypotheticality (i.e., consideration of hypothetical, rather than actual situations or events); or a combination of (1) – (4).

The purpose of this study is to provide a review of extant literature on CLT, which not only details the psychological underpinnings and logics of CLT, but also highlights the theory's potential for application in behavioral accounting research. CLT is a broad theory which argues that the process of *abstraction* enables individuals to direct thoughts at actions, objects, situations, events, or persons that reside outside their *direct* experience (Trope and Liberman 2010). Abstraction is the process of extracting the core meaning and central aspects of whatever one thinks about by peeling away peripheral, less essential aspects of the object of thought. According to CLT, the extent to which abstraction is employed is affected by the degree to which thoughts are directed away from one's *direct* experience. The resulting mental representation of the thought-object should, in turn, affect one's predictions, evaluations, and actions (Liberman and Trope 2008; Trope and Liberman 2010). Consider, for example, two auditors who need to decide whether or not to implement a new audit technology. One of the auditors considers using the new technology a year from now whereas the other auditor considers utilizing the new technology next week. According to CLT, the former auditor is more likely to base his decision on the broad advantages or disadvantages of employing the new technology and to be less influenced by secondary aspects of the implementation decision (e.g., how to document audit findings based on output from the new technology.). CLT offers similar predictions when one of the auditors considers implementing the technology for the audit of a spatially distant client whereas the other auditor considers implementing the technology for the audit of a spatially proximate client.

CLT has important implications for accounting research and practice as accounting professionals, organizational actors, and other decision-makers who rely on accounting information, routinely predict situations (e.g., financial performance of a company), express



preferences (e.g., render a choice among alternative courses of action), evaluate situations (e.g., decide whether to enter into a joint-venture), or act upon considerations that encompass varying degrees of *psychological distance* (Trope and Liberman 2010). According to Trope and Liberman (2010) “Psychological distance refers to the perception of *when* an event occurs, *where* it occurs, to *whom* it occurs, and *whether* it occurs (p. 442). Specific CLT propositions about *how* those predictions, evaluations, preferences, and actions are affected should thus enable behavioral accounting researchers to gain a deeper understanding of the heuristics and biases associated with judgment and decision-making in distance-affected decision environments.

Rooted in research on the psychology of predictions, CLT focused initially on individuals’ mental representation of future conditions in order to explain time-dependent disparities in preferences (Trope and Liberman 2000). Early CLT research thus aligns with a variety of research streams that investigate variation in reactions to future events depending on temporal distance: behavioral economics research points to excessive temporal discounting rates, decision-making research indicates higher risk tolerance and greater confidence when individuals consider distant future situations, and research on self-control and gratification-delay suggests that it is easier to postpone gratification pertaining to more distant future outcomes (Liberman et al. 2002). Common to all extant theories that explain future decision phenomena is the principle of time discounting (Trope 2004).<sup>3</sup> However, prior research has paid scant attention to mediating cognitive mechanisms that may underlie the observed temporal effects on decisions, evaluations, and judgments (Liberman et al. 2002). To remedy this shortcoming, Trope and Liberman (2003)

---

<sup>3</sup> Frederick et al. (2002) define the term *time-discounting* as a concept that includes “...any reason for caring less about a future consequence, including factors that diminish the expected utility generated by a future consequence, such as uncertainty or changing tastes” (p. 352).

proposed CLT as a potential common mechanism that could explain various aspects of temporal discounting identified by earlier theories (Trope 2004).

In an effort to extend the scope of temporal construal research, Trope and Liberman (2003) proposed that distance dimensions aside from temporal distance may be linked to construal level and thus be combined in a joined theory of psychological distance. The proposed psychological distance dimensions include temporal distance, social distance (e.g., in-group vs. out-group, oneself vs. others, and active social role vs. inactive social role), spatial distance, and hypotheticality. In a nutshell, “The basic premise of CLT is that distance is linked to level of mental construal, such that more distant objects will be construed at a higher level, and high-level construal will bring to mind more distant objects” (Trope and Liberman 2010, 444). Construal level, conceptualized as “a type of mental representation that is invoked by distance rather than as a distance dimension in its own right” (Liberman et al. 2007a, 114), affects predictions, evaluations, and behavior (Trope et al. 2007). The underlying reason for the association between psychological distance and construal level is presumed to stem from differential knowledge about near and distant events; the farther an event is removed from direct experience, the less dependable information is usually available, leading to the construction of more schematic (abstract) mental representations. CLT research shows that this association is overgeneralized such that it affects construal level even in the presence of comparable information about proximate and distant situations (Trope et al. 2003, 2007; Liberman et al. 2007a; Nussbaum et al. 2003). This basic research is the focus of section two of this review.

Research on CLT began to emerge in 1998 and gained significant momentum in 2006. Today, CLT is considered a prominent contemporary theory and comprehensive framework for judgment and decision-making (Fiedler 2007). A March 2015 Google Scholar search for

“Construal Level Theory” identified 49 articles on CLT published between 1998 and 2005, 545 articles published between 2006 and 2010, and roughly 1,770 articles between January 2011 and March 2015. Within the academic business literature, CLT is most heavily used by marketing researchers, followed by organizational behavior and management scholars.

Given the scope of CLT research, this review will necessarily be focused on CLT studies that are of particular interest to accounting researchers and highlight those articles’ main theoretical contributions. Since the purpose of this review is to illustrate CLT’s potential to facilitate the investigation of unexplained phenomena within the accounting domain, much detail is devoted to the literature’s explanation of the theory’s underlying logic and its explanatory power compared to related or competing theories; furthermore, interesting and commonly applied methods associated with experimental manipulations are highlighted. This results in an effort to include all seminal articles on CLT focusing on articles elaborating on key relationships or highlighting theoretical extensions, along with a few working papers with insights of particular interest to accounting researchers.

The remainder of this literature review is structured into four sections. Section two summarizes seminal articles which explain CLT in terms of its core insights and its relationship to related or competing theories. The third section reviews articles that explore CLT’s core propositions with respect to the four dimensions of psychological distance. Section four presents broad research questions for behavioral accounting research while section five offers concluding remarks.

### Basic Research on Construal Level Theory

Accounting professionals, organizational actors, and decision-makers in general routinely think about actions, situations, objects, persons, or events outside the realm of their *direct* experience. That is, they think about the future or the past, distant locations rather than proximate locations, other individuals' perceptions or experiences, or hypothetical events rather than actual events. They also make plans, render judgments, and make choices based upon, or influenced by those thoughts. More broadly speaking, individuals frequently direct their thoughts away from what they *actually* experience *themselves* at their present location (the 'here') at the present time (the 'now') (Liberman and Trope 2008; Trope and Liberman 2010).

According to CLT, directing one's thoughts away from the 'here' and 'now', shifting attention to other individuals' experiences, or considering hypothetical events constitutes a traversal of spatial distance (i.e., away from the 'here'), temporal distance (i.e., away from the 'now'), social distance (i.e., away from oneself), or hypotheticality (i.e., away from actuality). Proponents of CLT argue that the "human capacity for abstract processing of information" (Liberman and Trope 2008, 1201) permits individuals to traverse temporal distance, spatial distance, social distance, and hypotheticality. The theory further posits that temporal distance, spatial distance, social distance, and hypotheticality constitute four interrelated manifestations of distance that map onto a single, underlying construct termed 'psychological distance'. Accordingly, the aforementioned manifestations of distance are referred to as the four *dimensions of psychological distance* (Liberman et al. 2007c).

The cognitive process of abstraction, which operates similarly with respect to all four dimensions of psychological distance, leads to mental representations of varying degrees of abstractness, depending on the magnitude of psychological distance. In other words, the farther

the object of one's thoughts is distanced from the self at the present location and time along either dimension of psychological distance (or a combination thereof) the more abstract the object will be presented. Moreover, the relationship between mental representation (i.e., *construal level*) and psychological distance is *bidirectional*, implying that abstract mental construals prompt individuals to think of objects that are psychologically farther away. While the object of one's thoughts may be a course of action, an object, a person, an event, or a situation, the CLT literature commonly uses the terms '*objects*' or '*targets*' in order to simplify discussion. CLT refers to mental representations as '*construals*' and distinguishes those construals based on their degree of abstractness. Accordingly, an object may be construed at a higher or lower level depending on the individuals' *subjective* perception about the degree to which the object is removed from direct experience in terms of temporal distance, spatial distance, social distance, or hypotheticality. Importantly, the manner of mental representation affects individuals' prediction as well as their evaluations, preferences, and behaviors (Liberman and Trope 2008; Trope and Liberman 2010).

The basic premise of this literature review is that the former proposition has important implications for accounting research and practice as accounting professionals, organizational actors, and other decision-makers routinely predict events, express preferences, evaluate situations, or act upon considerations that encompass varying degrees of psychological distance. Figure 1 illustrates the process discussed above.

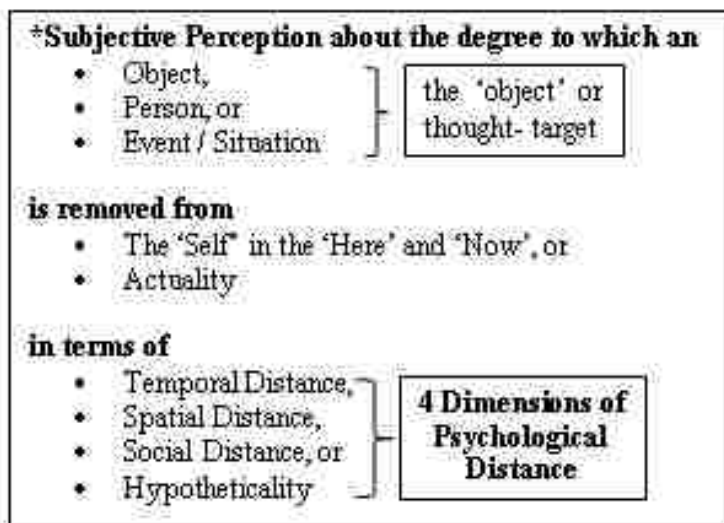
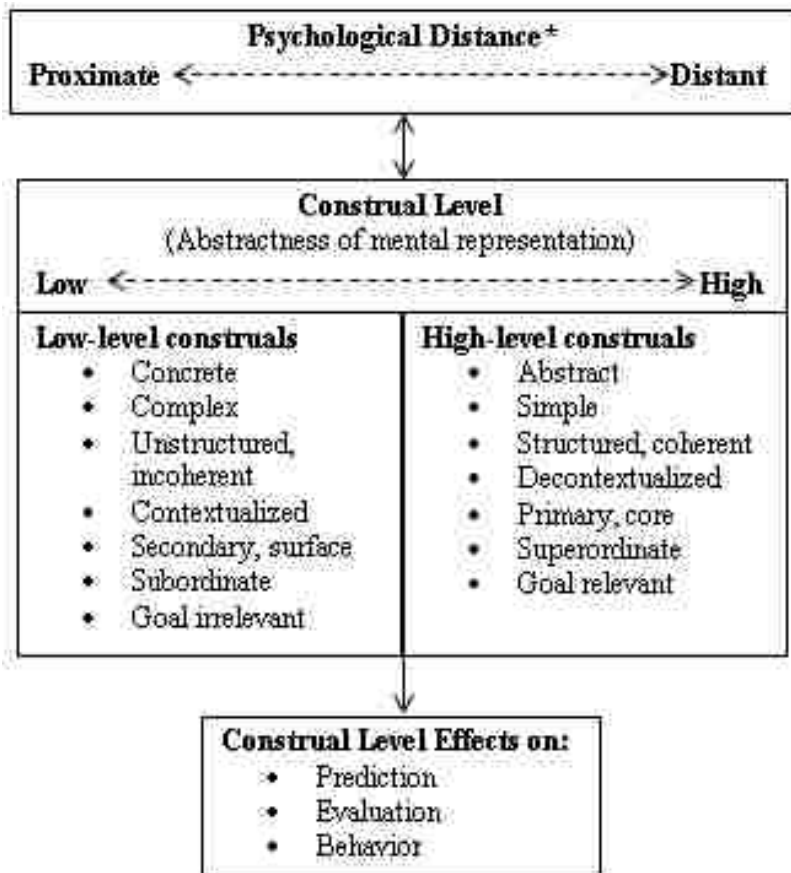


Figure 1: Overview of Construal Level Theory

Source: Trope and Liberman (2003)

Liberman and Trope's (1998) article on temporal construal theory (TCT) may justifiably be considered the foundation for an entire literature stream on construals culminating in CLT. The authors explain that prior research on time-dependent variations in expectations attributed overconfidence and the planning fallacy to the omission of *non-schematic* aspects of reality (i.e., aspects not included in the construction of the scenario) during the construction of future events and argue for a differentiation between gradations of *schematicity*. Specifically, Liberman and Trope (1998) distinguish between *low-level construals* which contain more concrete, contextualized, and subordinate features of a situation, and *high-level construals* which contain rather abstract, superordinate, decontextualized, and global aspects (see Figure 1). Given this distinction and the assumption that incidental and subordinate details are more easily brought to mind when a near future situation is assessed, TCT links temporal distance directly to the level of mental construal (Liberman and Trope 1998). Low-level construals thus dominate our thinking when the near future is considered and high-level construals when the distant future is of concern. Distant future thinking may thus suppress concrete, contextualized and peripheral aspects of a given situation (or replace the former with more abstract aspects), thereby facilitating a clearer depiction of the situation (Liberman and Trope 1998). Given the above discussed attributes of low and high-level construals, time dependent variations in values can be explained as follows: as positive or negative values may be attributed to the high or low-level features of a construal, the value assigned to high-level [low-level] aspects should be weighted higher [lower] in distant future construals. Thus, while the value attributed to high-level construals will grow over time, the value ascribed to low-level construals will be subject to temporal discounting. The value attributed to a high-level [low-level] construal should therefore

drive the perceived overall value of a situation or event in the distant [near] future (Liberman and Trope 1998).

Arguing that *feasibility* concerns (i.e., the subordinate *how* aspects according to goal subordination theory) represent low-level construals while *desirability* concerns (i.e., the superordinate *why* aspects according to goal subordination theory) represent high-level construals of alternative courses of action, Liberman and Trope (1998) show that desirability considerations are more heavily weighted than feasibility concerns when decisions about distant future actions or plans are rendered. The authors note that various aspects of their findings cannot be explained by competing theories such as action identification theory (Vallacher and Wegner 1987) or Gollwitzer's (1990) action phase theory (cf. Liberman et al. 2002). The researchers also rule out future optimism as a sole driver of their results since this concept is incapable of accounting for time-sensitive variations in the weighting of desirability concerns in decisions. Lastly, conflict models theory (Lewin 1951; Miller 1944) is ruled out as an alternative theoretical explanation as the predictions from this theory would not support the authors' finding that easy but undesirable alternatives are more [less] appealing in the near [distant] future (Liberman and Trope 1998).

Continuing this research, Trope and Liberman (2000) illustrate how *preferences* for activities, objects, and events are influenced by temporal distance notwithstanding constant decision-relevant information. The authors show that options that contain positive [negative] high-level construals but negative [positive] low-level construals are chosen [rejected] for the distant future and that either decision may be regretted as the realization of the choice approaches. A major contribution of Trope and Liberman (2000) is their discussion of the results from the perspective of competing time-discounting theories. With reference to the diverse



spectrum of social science research which has examined time-dependent variation in preferences, Trope and Liberman (2000) draw attention to two influential hypotheses: the *valence-dependent time-discounting hypothesis* (Lewin 1951; Miller 1944) and the *affect-dependent time-discounting hypothesis* (e.g., Loewenstein 1996; Vallacher 1993). While the former theory suggests that negative values are subject to greater time discounting than positive values, the latter suggests that the relative importance of cognitive value [affective value] increases [decreases] with temporal distance. Interestingly, Trope and Liberman's (2000) findings can only be partially explained by those competing theories. Contrary to predictions derived from valence-dependent time-discounting, results indicate that if the negative features of mixed options are high-level construals, the option's appeal decreases with temporal distance. Likewise, the results from one of their studies contradict predictions based on affect-dependent time-discounting; when the high-level construal is affective rather than cognitive, the weight attributed to affective value increases with temporal distance. Apparently, whether value is discounted or augmented depends on the level of construal to which value is attached (Trope and Liberman 2000).

Extending selected results from Liberman and Trope (1998) to objects and levels of construal other than actions and associated hierarchies (e.g., social situations), Liberman et al. (2002) find support for CLT-predicted temporal distance effects with respect to breadth of categorization, the degree to which anticipated experiences are expected to be prototypical, and the structural complexity of preferences. Events expected in the more distant future are construed more coherently and in more abstract, systematic, and simple terms. Liberman et al. (2002) also discuss construal levels in relation to differences between *heuristic vs. systematic* processing and note that high-level construals may only occasionally require less processing effort. Heuristic

processing entails the retention of easy-to-process aspects and ignorance of harder-to-process aspects, whereas high-level construal requires retention of central, relevant aspects and ignorance of contextual, subordinate aspects. Thus, as relevant aspects are not necessarily easy-to-process aspects, contradictory inferences can be expected. Further, CLT may provide a theoretical foundation to explain phenomena associated with counterfactual thinking, and prediction errors stemming from underweighting of contextual features such as overconfidence, the planning fallacy, and focalism (Liberman et al. 2002).

In a second seminal article, Trope and Liberman (2003) stress that a central aspect of high-level construals is that variation in their associated features lead to significant alterations in situational interpretation. Moreover, competing theories such as hyperbolic time discounting, magnitude effects, action identification theory, Gollwitzer's (1990) mind set theory, or future optimism cannot explain the results of prior studies as consistently as CLT. The latter argument is reiterated by Trope (2004) who stresses CLT's high explanatory power.

Detailed discussions of psychological distance and the concept of construal are also provided by Liberman et al. (2007c) who explain that the four manifestations of psychological distance are fixed on a single, zero-distance reference point (i.e., the direct experience of the present time and location) and that all other reference points are mental constructs. The authors also posit that the various dimensions of psychological distance are not only related to one another and somewhat interchangeable, but also produce effects that are alike and mediated by construal level. An interesting point raised by Liberman et al. (2007c) in connection with the effects of social distance concerns a comparison between the actor-observer effect in attribution (Jones and Nisbett 1972) and CLT. Unlike the actor-observer effect, CLT also explains that people construe themselves in more abstract terms when assuming a third person perspective.

This finding is certainly difficult to attribute to a lesser degree of knowledge about the target of construal (Liberman et al. 2007c).

In a contemporaneous article, Liberman et al. (2007a) emphasize the similarities among the various distance dimensions, but also point to notable differences among them with respect to inter vs. intra-individual variation (see Lynch and Zauberman 2007), dimensionality (e.g., time is unidimensional while spatial distance is not), controllability (e.g., social distance is more controllable than time), and valence (e.g., positive perceptions decline with social distance but usually increase with temporal distance). Rather than complicating analyses, those differences may be used to disentangle distance-related from other effects. Moreover, Fiedler's (2007) argumentation for the inclusion of additional dimensions of psychological distance into the CLT framework is objected in Liberman et al.'s (2007a) response on the grounds that the proposed dimensions lack objectivity.

Up to this point in the CLT development stage, the association between construal level and psychological distance had only been explored from a perspective that focused on the link between target attributes and the manner in which these targets are processed (Bar-Anan et al. 2006). However, later studies provide even stronger evidence for the relationship between level of construal and psychological distance by showing that (1) the association also exists on a pure conceptual level (i.e., in the absence of construal targets and their situation-specific context) (Bar-Anan et al. 2006); and (2) that the relationship is subconsciously activated (Bar-Anan et al. 2007). The theoretical insights of those studies are fundamental to CLT since they not only establish initial evidence for the assertion that all four dimensions of distance are manifestations of a single core construct (i.e., psychological distance) (Fiedler et al. 2012), but also that this construct is activated automatically (Bar-Anan et al. 2007).

Two recent studies that also investigate the association among all four distance dimensions are Fiedler et al. (2012), who show consistent positive correlations among all distance dimensions (across decision-makers and decision targets), and Maglio et al. (2013), who find support for Liberman et al.'s (2007a) proposition that distancing on one dimension leads to decreased marginal sensitivity toward a certain extent of distance on a second dimension (i.e., cross-dimensional distancing leads to effects similar to those associated with within-dimension distancing). Maglio et al. (2013) also find that a person's individual sensitivity to a second distance dimension mediates the impact of the first distance dimension on choice; and that a first instantiation of distance concurrently lowers sensitivity to additional distance manifestations both cross-dimensional and within-dimensional.

Several literature reviews on emerging CLT research have accompanied the theoretical development stage marked by, but not limited to, the majority of the above discussed research. Trope et al. (2007), for example, present a comprehensive review of CLT research concerning the link between distance and prediction, distance and evaluation (e.g., primary versus secondary features; desirability versus feasibility concerns; pros versus cons), and distance and behavior (e.g., forecasting intentions from values and overall attitudes; logrolling willingness in negotiation; susceptibility to the sunk-cost bias; perception of risk and time frames). A more concise review which places the human capacity for abstraction into an evolutionary context is provided by Liberman and Trope (2008). Their article addresses the bi-directional relationship between psychological distance and construal level and discusses research findings that illustrate this relationship in the context of perception, categorization, and inference.<sup>4</sup> In an even more

---

<sup>4</sup> Readers interested in the most comprehensive discussion of the CLT framework and associated research findings should refer to Trope and Liberman (2010) who also offer directions for future research.

focused literature review, Ledgerwood et al. (2010) explore the role of construal level on the consistency and flexibility of evaluations and the associated implications for social relations. Signals about psychological distance impact the degree to which evaluations diverge or remain constant across diverse social situations, and this fluctuation in consistency is exceedingly practical from a societal perspective. Table 1 summarizes basic CLT research and related syntheses papers.

### Selected Applications of Construal Level Theory

#### Research on Temporal Distance

A majority of CLT-based research has focused on the impact of temporal distance on construal level and related consequences for judgments and preferences, predictions, perceptions, evaluations, and behaviors. Temporal distance effects on decision-makers' judgment and preferences are not confined to variations in *actual temporal distance* from a situation or event, but also arise by variations in *subjective temporal outlook* (e.g., Kivetz and Tyler 2007; Rogers and Bazerman 2008). With respect to temporal distance effects associated with variations in *actual* temporal distance, research provides evidence of asymmetric weighting of payoffs (representing *desirability* concerns) and probability (representing *feasibility* concerns) in situations that are influenced by *random* processes (Sagristano et al. 2002; Liberman and Trope 1998). Further, the assessment of existing options is affected by merely considering an appealing, yet unattainable alternative (Borovoi et al. 2010). Moreover, the aforementioned effects may hold irrespective of actual event timing given that research suggests that *priming* decision-makers with a near future temporal outlook raises the appeal of instrumental incentives (e.g., cash bonuses) while a distant future temporal outlook leads to a preference of identity incentives

(e.g., preferential treatment) (Kivetz and Tyler 2007). A similar conclusion with respect to the efficacy of temporal priming can be drawn from Rogers and Bazerman (2008) who show that in situations which require an instant, binding decision, individuals are more likely to favor ‘should-choices’ when those go into effect in the distant future and that this ‘future-lock-in effect’ may also be achieved by merely changing decision-makers’ temporal focus. Further, mental simulation can be deployed to change construal levels in order to *reduce* intertemporal preference discrepancies (Zhao et al. 2007). Maybe even more important, decision-makers’ activities immediately prior to their decision affect the degree of *present bias*<sup>5</sup> inherent in their decision, depending on whether the prior tasks require an abstract processing mode or a concrete processing mode. Such effects can be attributed to the prior activity’s impact on the decision-maker’s construal mindset orientation (Malkoc et al. 2010).

As CLT suggests that psychologically distant actions and events foster a ‘big picture’ perspective (see Förster et al. 2004; Liberman et al. 2002), *predictions* of distant future actions and outcomes should be construed in more abstract and cross-situational stable terms. Cross-situational stability, in turn, should lead to higher prediction confidence. Indeed, individuals display higher confidence in their predictions of other individuals’ distant future behavior (Nussbaum et al. 2003). The temporally asymmetric weighting of dispositional vs. context-specific factors also applies to behavioral intentions related to oneself; plans for the distant future seem to be more consistent across contexts than those for the more proximate future (Eyal et al. 2009). More generally, the level of construal moderates the impact of temporal distance on prediction confidence (Nussbaum et al. 2006). Prediction-related CLT research also provides

---

<sup>5</sup> Present bias reflects the tendency to use higher discount rates for shorter time delays (i.e., hyperbolic discounting) (Malcok et al. 2010).

evidence of the bi-directional relationship between construal level and temporal distance by showing that individuals primed to adopt high-level [low-level] construals of a situation estimate the situation to occur in the distant [near] future (Liberman et al. 2007b).

CLT research concerned with temporal effects on *perception* shows that superordinate [subordinate] commonalities and differences are the primary drivers of perceived similarity between distant [near] future events or situations (Day and Bartels 2008). Those findings point to important implications for studies of cognition since similarity has been identified as a critical factor for memory, problem solving, inference generation, and knowledge transfer and generalization. In addition, temporal construals affect plans to engage in risk prevention activities, such that the strength of intentions is negatively related to the difficulty of the preventive action *only* when the risk is construed as temporally distant. Moreover, given that negative outcome valence leads to a focus on *risk* while positive outcome valence leads to a focus on *absence of risk*, a reversal of the above described framing effects accompanies a focus on the *absence of risk* and affects behavioral intentions and the efficacy of risk communication accordingly (Chandran and Menon 2004; Bonner and Newell 2008).

Several studies stress the profound impact of temporal distance on *evaluation*. Those studies have broad implications for accounting research as the evaluation of a proposed course of action or the assessment of alternatives constitute a common judgment among accounting professionals, financial statement users, and regulators. A key theoretical insight is that in the evaluation of future actions, *pro* considerations constitute high-level, superordinate construal aspects, whereas *con* considerations reflect low-level, subordinate construal aspects. That is, while the latter become decision-irrelevant in the absence of *pro* considerations, the reverse is not true (Eyal et al. 2004). In line with earlier CLT research indicating asymmetry in conditional

relevance of *desirability* versus *feasibility* features, the relative importance of *pro* and *con* aspects of a future activity is contingent on temporal distance (Eyal et al. 2004). It is easier to generate pro-arguments for distant future actions and con-arguments for near future actions (Herzog et al. 2007).

Research also indicates that an abstract [concrete] construal, associated with the assessment of distant [near] future situations facilitates [hinders] processing of nonalignable aspects (Malkoc et al. 2005) and aids focus on high-level arguments (Fujita et al. 2008). The latter finding suggests that communications highlighting desirability [feasibility] or goal-related [goal-unrelated] issues garner greater attention and lead to larger attitude changes when associated with distant [near] future experiences (Fujita et al. 2008). Therefore, the compatibility between temporal mindset and message abstractness raises the message's persuasive power through perceived *fluency* (Kim et al. 2009; Chandran and Menon 2004; Bonner and Newell 2008). Those findings, applied to the management information systems and interactive decision aid (IDA) context, provide valuable insights for accounting information systems researchers; performance evaluations are more positive (i.e., higher likelihood of advice acceptance) when a concrete [abstract] communication design is matched with low [high] temporal distance between IDA recommendation and product or service consumption; or with immediate [delayed] advice delivery (Köhler et al. 2011).

With a focus on temporal distance effects on actual behavior, research suggests beneficial effects of adopting a temporally distant perspective when creative action (Förster et al. 2004) or Pareto-efficient negotiation outcomes (Henderson et al. 2006b) are desired. With respect to creative action, a distant time perspective simplifies [hinders] abstract [concrete] thinking and thereby facilitates [impedes] performance at creative [analytical] tasks (Förster et al. 2004). With



respect to negotiation outcomes, greater temporal distance from a negotiation process, or the target event of the negotiation, facilitates integrative behavior throughout the negotiation process (Henderson et al. 2006b; DeDreu et al. 2009). Furthermore, with respect to construal level effects on temporal perspective (i.e., reverse causality), inducing a concrete construal of a task lowers the likelihood for procrastination of task performance (McCrea et al. 2008; Liberman et al. 2007b). Lastly, decision-makers consider large temporal distance from an anticipated event a sunk cost (independent of monetary sunk cost) that affects their behavioral intentions and commitment to the future event (Park and Jang 2014). Table 2 summarizes CLT literature focused on the temporal distance dimension of psychological distance.

#### Research on Spatial Distance

Research on the spatial distance dimension of psychological distance is comparatively sparse and recent. However, the study of how individuals transcend the ‘here’ comes to be increasingly relevant as people continue to expand their geographic horizons (Henderson et al. 2006a), particularly since technological advancements continue to reduce barriers for collaboration and interaction across large distances (Jia et al. 2009). Research suggests that individuals prefer to identify behavior as ends [means to an end] when the behavior is thought to occur at a distant [nearby] location and that purportedly distant [proximate] behavior is described in more abstract [concrete] terms (Fujita et al. 2006a). Moreover, decision-makers seem less inclined to extrapolate from outlier data when rendering forecasts about spatially remote events; and that prototypical [atypical] events are considered more [less] probable to occur at geographically more remote locations (Henderson et al. 2006a). Concerning social judgments, individuals exhibit greater correspondence bias when evaluating spatially remote behavior

(Henderson et al. 2006a) and the associated spontaneous trait inferences (containing dispositional information) are formed subconsciously (Rim et al. 2009).

Spatial distance research also complements findings from earlier temporal construal research with respect to psychological distance effects on behavior in terms of creativity (Förster et al. 2004) and negotiation outcomes (Henderson et al. 2006b). With respect to creativity, a simple cue such as the origin of an assignment can prompt higher-level construals and thereby more abstract cognition, leading to more creative problem solutions and creative insights (Jia et al. 2009). In the negotiation context, experiments in which negotiators believed to be either spatially close or spatially distant from their negotiation partner confirm that greater perceived spatial distance leads to more Pareto-efficient outcomes due to more adequate tradeoffs across high and low-importance issues (Henderson 2011). Lastly, a recent study examining *desirability* and *feasibility* aspects of an exogenous shock shows that greater shock distance and more optimistic organizational capability perceptions prompt managers to focus more on opportunities and less on threats associated with an external shock (Barreto and Patient 2013).

Accounting researchers interested in spatial distance effects on decision-makers' mental representation, judgment, and behavior are referred to Henderson and Wakslak (2010) who present a comprehensive review of spatial distance related CLT research and articulate paths for future research. In a complementary study, Henderson et al. (2011) review CLT research that has examined the *bidirectional* relationship between spatial distance and construal level. The authors also discuss important covariates and unique aspects of the spatial distance dimension of psychological distance. Table 3 summarizes CLT literature focused on the spatial distance dimension of psychological distance.

## Research on Social Distance

CLT-informed social distance research suggests that increased interpersonal similarity prompts individuals to construe and process information regarding another individual's activities in more concrete terms. Consequently, the actions performed and judgments rendered by others who are considered similar are identified and judged to a greater extent based on incidental, subordinate features relative to core, superordinate features (Liviatan et al. 2008). Based on earlier CLT studies which document that moral transgressions are judged less leniently from a psychologically distant perspective (e.g., Eyal et al. 2008), increased consideration of contextual information associated with the evaluation of a socially proximate leader prompts better ethical leadership ratings (Tumasjan et al. 2011). Moreover, higher moral evaluations following an ethical transgression correlate with a more positive evaluation of the leader-subordinate relationship.

Economic implications from social distancing are highlighted in a study that investigates the impact of social distance on rational decision-making in the ultimatum game; negative emotional arousal (i.e., a peripheral concern) associated with an unfair offer is more likely to be discounted when the decision is made on behalf of another individual rather than for oneself (Kim et al. 2013) (see related discussion of self-control and far-sightedness, Fujita et al. 2006b; Loewenstein 1996). Furthermore, with respect to decision-makers' behavior, social distancing (i.e., acting on behalf of another individual) has similar effects on creativity as temporal and spatial distancing (Polman and Emich 2011). Decision-makers display lower willingness to allocate resources to a target when the target is construed in more abstract terms (Stephan et al. 2011).

How social distance and temporal distance combined influence the assessment of products with contradictory high and low-level features (e.g., positive core attributes and negative peripheral attributes) has also been examined. In conditions which reflect proximity on both temporal and social distance, product assessments seem to be driven by the value attributed to the low-level construals, whereas in conditions characterized by remoteness on either distance dimension (or both), product assessments seem to be more affected by the value attributed to high-level construals (Kim et al. 2008). Table 4 summarizes CLT literature focused on the social distance dimension of psychological distance.

#### Research on Hypotheticality

The impact of hypotheticality on mental representation has been largely ignored in the literature on the generation and utilization of probability judgments and in research on decisions under uncertainty (e.g., expected utility theory; prospect theory) (Wakslak et al. 2006). Addressing this research gap, Wakslak et al. (2006) find that probability is inversely (and bi-directionally) related to level of construal: unlikely events cause individuals to focus on the events' abstract, superordinate, global aspects while more likely events draw attention to detail-level, specific, subordinate aspects. Wakslak et al. (2006) offer two intriguing predictions with respect to preferences and options: (1) higher level features (e.g., personal values) should determine choices about less likely events; and (2) with respect to multi-feature outcomes, the less likely the attainment of the outcome, the more weight should be given to superordinate, global aspects of the outcome compared to subordinate aspects. Todorov et al. (2007) explore the latter and show that desirability considerations are more prominent than feasibility consideration when outcome-probability is low. However, as the outcome probability rises (that is,

psychological distance decreases), feasibility concerns may become even more prominent (but not less) than desirability concerns.

Probability judgments are also affected by individuals' overall cognitive mindset in addition to their affective state; an abstract mindset fosters the perception of improbability whereas a concrete mindset fosters the perception of likelihood (Wakslak and Trope 2009). Further, individuals relate probability to spatial distance and temporal distance and consequently anticipate that less [more] likely events happen at remote [proximate] locations and in the distant [near] future (Wakslak 2012). Table 5 summarizes CLT literature focused on the hypotheticality dimension of psychological distance.

#### Overall Mindset Implications of Psychological Distance

Many CLT studies are not primarily focused on either one of the psychological distance dimensions, but rather on the effects of a concrete versus abstract construal mindset itself, irrespective of how either mindset orientation is initiated (e.g., through distancing on either psychological distance dimension, or through procedural priming). One such stream of CLT research investigates how construal mindset orientation affects perceptions of other individuals' self-regulatory efforts (e.g., Freitas et al. 2004) and one's own ability to exert self-control (e.g., Fujita et al. 2006b; Agrawal and Wan 2009; Fujita and Han 2009). With respect to the former, mindset orientation directs attention to either long-term (abstract mindset orientation) or short-term (concrete mindset orientation) goal-relevant aspects of others' situations; the mindset-induced focus, in turn, affects the prediction and guidance of the observed individual's self-regulatory actions (Freitas et al. 2004). Concerning one's own self-regulatory efforts, individuals who adopt an abstract mindset stand a better chance at maintaining self-control (Fujita et al.

2006b; Fujita and Han 2009) as they have less trouble relating temptations to negativity (Fujita and Han 2009). Further, the negative impact of resource depletion on individuals' ability to exercise self-discipline in consecutive self-control challenges is only evident among those who adopt a low-level construal mindset (Agrawal and Wan 2009). An abstract construal of an activity's purpose assists people in focusing their decisions towards the values, objectives, and characteristics inherent to their ideal self-perception (Freitas et al. 2008). Researchers interested in gaining additional insights into the domain of self-regulation should refer to Fujita and Carnevale (2012) who review the self-control literature and discuss evidence of the effect of construal level on self-control in terms of temporal discounting, choice and action, and prospective self-control.

Closely related to studies of self-control is research concerned with ethical decision-making. Eyal et al. (2008) explore how moral evaluations are influenced by temporal and social distance from the appraised action. Individuals evaluate moral [immoral] actions as more virtuous [objectionable] when the actions are psychologically distant rather than proximate. Taylor and Curtis (2013) draw on those findings and propose that the psychological closeness among audit team members may bias their assessment of the severity of a colleagues' transgression downward and accordingly lower their willingness for whistleblowing.

CLT research also offers valuable insights into the domain of feedback seeking and suggests that obtaining accurate, but possibly negative feedback (i.e., realistic self-assessment) is the core goal of self-evaluation and hence reflects desirability concerns. Not surprisingly then, individuals who adopt a high-level [low-level] construal mindset seek realistic [positive] feedback (Freitas et al. 2001). Moreover, lower-level [higher-level] construal promotes [lowers] information search desirability in situations that involve the potential discovery of unpleasant

truths about prior decisions (e.g., whether the failure to invest in a rising stock was really a missed opportunity) (Shani et al. 2009).

CLT-informed communication medium studies explore both how words compared to pictures affect perceived psychological distance (see Amit et al. 2009) and conversely, how psychological distance affects individuals' preference for either communication medium (see Amit et al. 2013). Given that words convey meaning, reflect entire categories, and are usually context-independent, verbal representations constitute high-level construals whereas pictorial representations, which are situational and specific representations, constitute low-level construals. Pictures [words] are more suitable for the representation of psychologically proximate [distant] targets (Amit et al. 2009). Individuals' *relative* preference of words over pictures rises with increased psychological distance from the message recipient. This relationship is bidirectional such that given the availability of a specific medium individuals prefer communication with a proximal (for pictorial messages) or distant (for verbal messages) recipient (Amit et al. 2013). Importantly, the message-medium congruency is positively related to recipients' likelihood of following a communicated recommendation. From a theoretical perspective, the aforementioned communication-medium studies are informed by more basic CLT research by Liberman and Förster (2009) who focus exclusively on visual representation and thus on levels of *perceptual* construal. Priming with temporal, spatial, or social distance makes it easier to attend to global (Gestalt) features and harder to attend to specific details in a visual task.

CLT may also explain a wide variety of economic decisions and behaviors that are often counterintuitive from the perspective of economic models that take preference consistency and expected utility maximization for granted (Leiser et al. 2008). Specifically, it has been proposed

that the discrepancy between one's own risk preferences and those predicted for others can not only be explained in terms of CLT, but also be reduced through CLT-informed de-biasing mechanisms. Given that risk-neutral preferences are high-level construals (maximize long-term payoff), they are more likely to be attributed to others (who are socially distant); accordingly, an individual who predicts others' risk preferences (e.g., a manager who must decide whether to offer a cash bonus or stock options) may render more precise forecasts when construing the target person at a lower level. Economics-based research also explores how construal level priming may be effectively used to encourage cooperation in situations characterized by social dilemmas and further encourages research to investigate other construal level effects on mixed-motivation interactions (e.g., Prisoner's Dilemma scenarios) (see Sanna et al. 2009). Sanna et al. (2009) show that high-level construal of a social dilemma scenario leads to greater cooperation, thus alleviating what Hardin (1968) termed the *tragedy of the commons*.

Exploring the association between power and cognition, Smith and Trope (2006) provide experimental as well as initial neuropsychological evidence that individuals with power are more inclined to construe available information at a higher level. Specifically, priming subjects with the notion of being in a powerful position promotes 'big picture' thinking and a focus on critical issues. The contention that an abstract mindset facilitates focus on decision-critical issues was later tested by Cantor and Macdonald (2009). The results indicate that participants who adopt an abstract problem-solving style outperform those who adopt a concrete problem-solving style when a limited amount of information is available. However, research also points to negative consequences associated with abstract cognition by identifying a critical link between mindset orientation and the illusion of explanatory depth (IOED) (e.g., Rozenblit and Keil 2002). IOEDs arise as a consequence of mistaking knowledge about high-level concepts with a deep



understanding of the target's underlying, concrete aspects (Alter et al. 2010). Thus, whenever individuals automatically embrace a high-level construal style, they may mistakenly believe that they possess detail-level knowledge and thus forgo further information search. Further support for these conclusions is provided in a study showing that power seems to have a detrimental effect on managers' capability to design proper incentive systems (Magee et al. 2011).

Potential implications for time-related phenomena, such as planning, assessments, and performance are highlighted by research that demonstrates that individuals experience time differently depending on whether they adopt a concrete or abstract construal mindset. Based on earlier CLT studies which have shown that low-level construal leads to higher segmentation of a given situation (e.g., Henderson et al. 2006a; Wakslak et al. 2006), concrete mental representation should prompt the perception of more situational variation, and hence the experience that "time flies" (Hansen and Trope 2013). Variation of high-level [low-level] features of a situation prompts individuals with an abstract [concrete] mindset to perceive time as passing quicker.

CLT's underlying assumption that the absence of experience is directly related to construal level has been explored in experiments using subliminal exposition to unfamiliar stimuli (see Förster 2009) as well in experiments comparing direct vs. indirect product exposure effects on construal level (see Hamilton and Thompson 2007). The aggregate results confirm that deviance from direct experience leads to higher level construal and abstract information processing. Further, *preferences* based on direct and indirect experiences converge when individuals are prompted to adopt a low-level construal prior to their indirect product experience (Hamilton and Thompson 2007).

Wilson et al. (2013) not only extends CLT from a theoretical perspective, but also places the extension in a context that should be of interest to accounting researchers. The authors apply CLT to the domain of distributed (virtual) teams and identify contextual moderators of the association between objective distance and psychological distance. The contextual factors identified include organizational structural assurance; feedback loops; leadership intervention; interaction history; team structure, composition and work practices; and technology affordances. Based on this theoretical extension, the authors offer several interesting propositions: (1) higher team task interdependence as well as increased stability of team membership will lessen the impact of objective distance on psychological distance; (2) higher degree of technology adaptation to the group-specific needs lessens the impact of objective distance on psychological distance; (3) selecting a lower-bandwidth medium if a higher-bandwidth medium is accessible magnifies the impact of objective distance on psychological distance; and (4) better historical team performance lowers the impact of objective distance on psychological distance. Focusing on IT teams, Cha and Park (2014) show that *proximity* along various psychological distance dimensions has beneficial effects on both teamwork *quality* and *performance*. Specifically, spatial, temporal, and social distance not only affect different teamwork quality factors (i.e., team communication, coordination, collaboration, and cohesion), but also vary with respect to their strength of impact. Table 6 summarizes construal mindset oriented CLT research.

#### CLT-Informed Accounting Research

Only a few accounting studies to date, most of them at the working-paper stage, draw on CLT as a theoretical foundation. Among those, several examine how *overall mindset orientation* affects decision-makers' behavior and judgment. Those studies show that mindset orientation has

important implications for the decisions rendered and actions taken by professional (e.g., Backof et al. 2013; Backof et al. 2014; Rasso 2014) and non-professional decision-makers (e.g., Elliott et al. 2014; McPhee 2014).

Managerial accounting research indicates that the effectiveness of different incentive types not only hinges on the type of task the incentive is intended to motivate, but also on temporal considerations (McPhee 2014). Specifically, promising cash incentives to be paid in the near future (which prompts a concrete mindset orientation) is most suitable for motivating high performance on an analytical task. However, with respect to creative tasks, promising non-cash incentives to be awarded in the distant future (which induces an abstract mindset orientation) is equally effective (and possibly more cost-effective). This research points to the importance of *aligning* information processing orientation, instantiated by properly matching reward type and temporal distance, with behavior (i.e., performance).

Audit research has investigated how auditor skepticism is affected by (a) the manner in which management presents evidence for its complex accounting estimates (i.e., graphical versus verbal presentation) and (b) auditors' judgment framework (*how* versus *why* considerations) (Backof et al. 2014). Building on Amit et al.'s (2009) findings that pictorial presentation, compared to verbal communication, leads to lower level construal, Backof et al. (2014) show that pictorial presentation facilitates the detection of trend deviations. The researchers also identify a CLT-based intervention mechanism that increases professional skepticism: prompting auditors to reflect on *how* (rather than *why*) management arrived at its assumptions draws their attention to concrete deviations from historical trends, that is, to contradictory information. However, Backof et al. (2013) identify circumstances under which a deliberative (i.e., abstract) mindset achieved by considering *why*-questions effectively increases professional skepticism.

Increased psychological distance improves auditors' ability to restrain aggressive financial reporting by drawing attention towards the economic substance of a transaction. Rasso (2014) bridges Backof et al. (2014) and Backof et al. (2013) by showing that an abstract mindset orientation, induced by simple CLT-informed audit documentation instructions, can increase auditors' professional skepticism when a piecemeal evidence gathering process accompanies the evaluation of complex estimates (i.e., in situations in which auditors face incomplete evidence sets). The author shows that auditors' ability to see the *big picture* and to assimilate large amounts of evidence is enhanced when auditors are challenged to evaluate audit evidence *broadly* and to question *why* the client's estimate may be materially misstated or fairly presented.

Within the financial accounting domain, research indicates that *mindset orientation* affects professional and non-professional investors' judgment and behavior. Lundholm et al. (2014) conduct a textual analysis of corporate earnings press releases and Management's Discussion and Analysis (MD&A) sections of 10-K filings and find that both the frequency of numerical statements and the overall readability of the examined publications increases with geographic distance between the foreign firm and the U.S. The authors conclude that foreign firms may effectively lower potential U.S. investors' psychological distance by providing more concrete (i.e., numerical, based on CLT) and more readable disclosures.

Elliott et al. (2015) demonstrate that Corporate Social Responsibility (CSR) performance reports which properly match pursued corporate CSR strategy (e.g., focus on local vs. global activities) with communication style (i.e., by highlighting pictures vs. words) promote processing fluency and subsequently non-professional investors' willingness to invest. Results also indicate that the fit between described strategic efforts and presentation style *subconsciously* affects

investors' willingness to invest and that the aforementioned results apply only to investors who are less numerate (i.e., those who tend to rely more on non-numerical information).

The remaining three CLT-informed accounting studies examine specific dimensions of psychological distance by exploring spatial distance effects (Elliott et al. 2014; Weisner and Sutton 2015) and temporal distance effects (White 2014) on judgment and behavior. Set within the financial accounting context, Elliott et al. (2014) show that investors are more willing to invest in a firm when concrete language, rather than abstract language, is highlighted in an investment prospectus. This relationship is particularly pronounced when the spatial distance between investor and firm is large given that increased psychological distance is associated lower investor comfort.

With a focus on *temporal distance* effects on investors' decision-making, White (2014) demonstrates that investors' investment horizon (i.e., temporal outlook) affects their sensitivity to disclosed uncertainty. Specifically, investors who are focused on short-term rather than long-term financial performance exhibit greater sensitivity to variations in fair value input level and related measurement disclosures when assessing the uncertainty associated with a disclosed estimate. Moreover, sensitivity to uncertainty and related disclosures also affects judgments of overall firm value, potentially leading to biases in investor decision-making.

Lastly, CLT-informed audit research shows how *spatial distance* can affect audit professionals' judgment even in situations in which geographic proximity is decision-irrelevant. Combining insights from basic CLT research and theoretical extensions proposed by Wilson et al. (2013), Weisner and Sutton (2015) show that increased spatial distance between an audit client and a management-appointed, teleworking specialist reduces auditors' reliance on the work of the specialist. Further, the reliance decision interacts with the auditors' historical

experience with their client's internal audit function (IAF) such that reliance is lowest when prior experience indicates a weak IAF. The authors also developed and validated instruments for assessing individuals' propensity toward spatial and cultural sensitivity. Table 7 summarizes the CLT-informed accounting literature.

### Implications for Accounting Research

The link between distance and prediction, distance and evaluation (e.g., primary versus secondary features, desirability versus feasibility concerns, pros versus cons, alignable versus non-alignable features), and distance and behavior (e.g., forecasting intentions from values and overall attitudes, logrolling willingness in negotiation, exertion of self-control, susceptibility to the sunk-cost bias) is summarized by Trope et al. (2007) and illustrated via numerous articles reviewed in the preceding section. Based on this review, this study argues that accounting academicians should further explore those links and associated implications for prediction, evaluation, and behavior in accounting relevant settings.

The following paragraphs offer broad research questions for behavioral accounting researchers of various disciplines. While the research questions are grouped by discipline (accounting information systems, audit, financial and managerial accounting, and tax), some overlap may exist. Most research questions make reference to psychological distance in general rather than specific dimensions in order to avoid repeating the research question whenever more than one manifestation of psychological distance is of interest.<sup>6</sup> Another word of caution seems appropriate. Not all research questions presented are claimed to address formerly disregarded areas of investigation; however, CLT-based inquiry and the associated focus on underlying,

---

<sup>6</sup> See Liberman et al. (2007c) for a discussion of the interchangeability of the various distance dimensions with respect to their effects on prediction, evaluation, and behavior.

mediating cognitive processes may deepen our understanding of various phenomena previously examined through another lens or framework. Furthermore, the four dimensions of psychological distance are not purported to be equally relevant (or interesting) to each accounting discipline and related research questions. For example, while the temporal distance dimension may be of particular interest in the domain of managerial accounting (e.g., forecasting associated with capital projects) or auditing (e.g., engagement timing), the investigation of the impact of other dimensions of psychological distance (particularly spatial distance and hypotheticality) may offer more novel insights. The reason for this is that fewer alternative theories that may lead to equivalent predictions (e.g., refer to the earlier discussion of competing time-discounting theories) are available for researchers to draw upon. However, as several of the reviewed articles illustrate, the broad CLT framework may also explain preference reversal phenomena or identify asymmetry in focus on decision-relevant features that contradict extant theories. A CLT approach offers the opportunity to revisit earlier studies that failed to find expected results.

Another fruitful avenue for revisiting extant research and for exploring the research questions explicated below would be to focus on multiple dimensions of psychological distance (i.e., cross-dimensional distancing; see Maglio et al. 2013). Once sufficient support for the applicability of core CLT propositions to the accounting context has been established, the intersection between CLT and other theories commonly applied in behavioral accounting research should be investigated. Examples of more specific future research opportunities are discussed in the following subsections.

## Accounting Information Systems (AIS)

As illustrated by several of the reviewed studies, research finds overwhelming support for the CLT proposition that, depending on psychological distance, decision-makers differentially weight *desirability* versus *feasibility* considerations associated with a course of action or object. Moreover, this research shows that preference reversal may occur. Accounting information systems researchers could explore whether technology implementation decisions are affected by psychological distance.

RQ<sub>1a</sub>: *How does psychological distance affect technology implementation decisions?*

RQ<sub>1b</sub>: *Does the weight attributed to desirability vs. feasibility considerations change as a result of shifting psychological distance?*

Another fundamental question for AIS researchers, which is derived from the CLT proposition that construal mindset affects decision-makers' predictions and judgments (e.g., Trope et al. 2007), concerns decision aid design. AIS researchers may want to investigate how decision aid design influences users' construal mindset orientation and hence their interpretation and acceptance of the decision aid's output.

RQ<sub>2a</sub>: *Does decision aid design affect construal mindset orientation? Can decision aids be designed to mitigate CLT biases?*

RQ<sub>2b</sub>: *Which decision aid design features should allow for flexibility such that congruency between decision task type and mindset orientation is maximized?*

Several other interesting avenues for future research are offered by Wilson et al. (2013). A closer look at Wilson et al.'s (2013) model and related propositions is recommended as a



wealth of research opportunities are presented. Particularly Proposition 7A on technology adaptation and Proposition 7B on media choice should draw attention from AIS researchers as either proposition could be tested in the context of distributed audit teams or in the context of dispersed corporate accounting team members.

### Audit

Building on insights from Henderson et al. (2006), audit researchers may wish to explore how the timing of negotiations between auditors and their clients affects negotiation outcome and consequential satisfaction of either party. Similarly, the effect of spatial distance in technology-facilitated negotiations may be explored through a CLT-lens.

RQ<sub>3</sub>: *Is auditor-client negotiation outcome affected by psychological distance?*

Future research could also apply CLT insights concerning data patterns (refer to RQ9 for a brief explanation) to the audit context. For example, researchers could investigate whether going-concern opinions are more likely to be issued to a spatially distant client, compared to a spatially proximate client, if graphically displayed financial information supplements other decision-relevant information.

RQ<sub>4</sub>: *How does psychological distance from an audit client affect the interpretation of graphically presented financial information or other types of audit evidence?*

Another avenue for audit research would be to explore whether asking *why* versus *how* questions (see Wakslak and Trope 2009; Backof et al. 2013, 2014) - for example during a pre-engagement brainstorming session - affects cognitive orientation and subsequently audit risk

judgments. Such inquiry could offer interesting, cognition-based insights for the professional skepticism literature.

*RQ<sub>5</sub>: Is client risk assessment affected by overall mindset orientation?*

Aside from informing auditors' judgment related to their client, CLT may also be used to investigate various phenomena concerning the audit firm's internal processes and related employee perceptions. For example, McCrea et al.'s (2008) finding that individuals are less prone to procrastinate when they receive instruction that triggers more concrete construal suggests that more concrete review notes lead to less delay in clearing 'points'.

*RQ<sub>6</sub>: Are auditors less prone to procrastinate when review points are framed concretely?*

Additionally, research opportunities identified by Wilson et al. (2013) and Wakslak et al. (2008) may be adapted to inform the audit literature on performance reviews and feedback. Applied to an audit setting, Wilson et al. (2013) can be interpreted as suggesting that accounting professionals may find it particularly hard to accept the receipt of negative feedback for behavior at a remote location as such behavior may have run counter to their perceived core identity and associated professional values. Relatedly, Wakslak et al. (2008) suggest that one could hypothesize and test whether negative feedback (e.g., in an audit review setting) prompts weaker spillover effects in situations in which the feedback refers to something associated with the near future.

*RQ<sub>7</sub>: How is auditors' acceptance of negative feedback affected by psychological distance?*

From the perspective of the reviewer and adapted to the audit context, Wilson et al. (2013) may be interpreted as suggesting that researchers investigate how performance reviews of

geographically distant versus proximate audit team members vary based on supervisors' attention to global versus contextualized performance aspects. This research question, adapted from Wilson et al. (2013), is based on the authors' argument that memory about performance should be differentially stored and retrieved and thus should lead to different evaluations.

RQ<sub>8</sub>: *How are performance reviews affected by psychological distance?*

### Financial and Managerial Accounting

An interesting research question for financial accounting researchers comes directly from Henderson et al. (2006a) who find that psychological distance affects the interpretation of data trend patterns. The authors suggest that an “implication of [their] studies is that when individuals (e.g., U.S.-affiliated stock brokers) make decisions (e.g., investments) based on information about spatially near events (e.g., stock market information on Wall Street) rather than distant events (e.g., the stock market in Tokyo), they will be more likely to exaggerate the significance of small departures from general data patterns” (p. 853). Interpreted more broadly, accounting researchers could investigate how the interpretation of graphically depicted data patterns varies based on distancing on any psychological distance dimension.

RQ<sub>9</sub>: *How does psychological distance from an investment target affect the interpretation of graphically presented financial information?*

This research question is not limited to studies of (non-) professional investor decision-making. Application in a managerial budgeting context involving projected financial data would seem equally interesting.

Another appealing research question comes from Liberman et al. (2007a) who argue that if certain investment decisions are susceptible to bias due to risk aversion, taking a distal

perspective may mitigate this problem. This argument is based on Liberman et al.'s (2007a) conclusion that risk, which is a lower-level attribute, will decline in salience with increasing psychological distance. Researchers could thus investigate if the use of established de-biasing mechanisms (e.g., considering the *why* aspects of a decision) reduces investors' or managerial decision-makers' risk aversion.

RQ<sub>10</sub>: *Can psychological distancing reduce risk aversion related to financial decisions?*

CLT findings with respect to the consideration of alternative courses of action may also open multiple avenues for accounting research. Liberman et al. (2007a), for example, argue that as psychological proximity increases, *conceptual* alternatives (e.g., insurance vs. savings) may become less salient while *contextual* alternatives (e.g., the number of insurance plans likely to be considered) draw increased attention. Accounting researchers would be well equipped to explore this proposition in the domain of risk management. Similarly, the effect of psychological distance on consideration-set choice could be investigated in the context of corporate investment decisions and capital budgeting.

RQ<sub>11</sub>: *How is the consideration of alternative risk management practices affected by psychological distance?*

RQ<sub>12</sub>: *How is the consideration of alternative corporate investment options affected by psychological distance?*

Another highly relevant research question related to the domain of risk management can be traced back to Henderson et al. (2006a). Henderson et al. (2006a) suggest that with respect to distant events (e.g., operations at remote corporate divisions), individuals (e.g., risk managers)

may be more inclined to devote scarce resources towards preparation for rather common contingencies than for the preparation for more unusual risk factors.

RQ<sub>13</sub>: *Does psychological distance affect the selection of risk response choices (e.g., through variation in the weight attributed to desirability vs. feasibility considerations)?*

Additionally, CLT-based risk management research could examine whether Chandran and Menon's (2004) findings hold in the context of business or investment risk communications and explore whether organizational commitment to risk-mitigating actions mirror those identified for individuals in the context of health risks. Such inquiry could be informative to managerial and financial accounting researchers alike.

RQ<sub>14</sub>: *How is the communication of business risk to external and internal stakeholders affected by psychological distance?*

RQ<sub>15</sub>: *How is commitment to risk mitigating practices affected by psychological distance?*

The literature on management credibility may also benefit from extensions inspired by psychology-based CLT research. For example, Fujita et al.'s (2008) and Kim et al.'s (2009) finding that the persuasiveness of a communication is enhanced through careful alignment between psychological distance and focus on either high-level or low-level aspects of the message could be explored in the context of executive communications with investors or shareholder activists. For example, revealing the location of an apologetic CEO (Elliott et al. 2012) and hence his spatial distance from the message recipient may affect psychological distance and consequently the recipient's focus on different attributes of the message. Alternatively, management credibility could be investigated in the context of MD&A discussions

or news releases in which management describes the prospects of a new venture occurring in the near future or distant future or at a proximate vs. distant location.

RQ<sub>16</sub>: *How are perceptions of management credibility affected by psychological distance?*

A number of appealing research questions related to managerial probability judgments can either be directly traced to Wakslak (2012) or inferred from her directions for future inquiry. One interesting proposition from Wakslak (2012) is to investigate judgments about the likelihood that a bid for a proximate versus remotely located project will succeed. Another recommendation by the author can be interpreted as encouraging the investigation of how the likelihood that a ‘black swan’ event occurs is affected by temporal distance. Lastly, Wakslak (2012) suggests that research take a closer look at managerial assessment of the probability that a remotely supervised, compared to a proximately supervised, team member does not complete a project in time. Clearly, the latter question also seems a prime target for investigation in an audit context. More broadly stated the following research question could be explored in a variety of settings:

RQ<sub>17</sub>: *Does psychological distance affect managerial probability assessment?*

Another likely target for application of CLT to the managerial accounting domain would be the analysis of (1) whether critical budgeting decisions (or make-or-buy decisions) are influenced by psychological distance to the target; and (2) whether psychological distance affects managers’ commitment to long-term capital projects. CLT would predict that a project manager’s spatial distance from a capital project she oversees affects her consideration of *desirability* versus *feasibility* concerns. This may have important consequences for the escalation of commitment and related resource allocation decisions (see also Park and Jang 2014 with respect to temporal distance related perceptions of sunk cost). Similarly, a project manager’s

perception of the likelihood that a new, risky capital project will succeed may be affected by temporal distance between the likelihood assessment and the planned commencement of the project and hence affect her support of the project. More broadly stated:

RQ<sub>18a</sub>: *How does psychological distance affect corporate budgeting decisions?*

RQ<sub>18b</sub>: *Does the weight attributed to desirability vs. feasibility considerations change as a result of shifting psychological distance?*

RQ<sub>19</sub>: *How is managerial support of a capital project affected by psychological distance?*

RQ<sub>20</sub>: *Is the escalation of commitment in a corporate budgeting setting moderated by psychological distance?*

The impact of psychological distance on decision-makers' ability to generate *pros* and *cons* for a course of action represents another consistent finding in the CLT literature that may have implications for corporate planning efforts as well as for business advisory services (including tax planning) in a variety of settings. Accounting researchers may thus want to investigate how the timing of brainstorming or planning sessions (in relation to the decision-implementation stage) affects support for the decision-target.

RQ<sub>21</sub>: *Does the timing of brainstorming sessions influence outcome?*

Aside from informing probability judgments and budgetary decisions, CLT may also offer a novel framework through which business ethics research can be advanced. Particularly the insights from CLT-based self-regulation studies may enable researchers to gain a deeper understanding of the cognitive processes associated with ethical decision-making in a corporate context. Accounting researchers could, for example, investigate how temptations to engage in

ethically questionable acts could be mitigated by psychological distancing. Such inquiry may also be of interest to researchers interested in earnings management.

*RQ<sub>22</sub>: Does psychological distancing lead to more ethical choices by corporate decision-makers?*

A few additional, highly relevant research questions are provided by Koonce et al. (2011) who offer a brief discussion of CLT with a focus on the theory's temporal distance dimension. Those authors also offer directions for future research related to the managerial and financial accounting context.

#### Tax

Of interest to behavioral tax researchers may be the question whether tax planning work (or litigation support service), compared to tax compliance work, induces a more abstract mindset which subsequently affects decisions in a multi-task, multi-client environment. CLT would suggest that tax professionals who have adopted an abstract mindset assess the probability that a questionable deduction will be allowed, or that a client will be subject to an IRS audit (or prevail in tax court), to be lower than tax professionals who have adopted a concrete mindset.

*RQ<sub>23a</sub>: Does tax planning prompt tax professionals to adopt an abstract mindset?*

*RQ<sub>23b</sub>: Does construal mindset affect tax professionals' judgment?*

Given the potentially severe impact of tax professionals' judgment on their clients' financial well-being, the effectiveness of de-biasing interventions suggested by Leiser et al. (2008) may also be explored.



## Conclusion

This research reviews the literature on construal level theory (Liberman and Trope 1998; Trope and Liberman 2003) - a theory of social cognition (e.g., Amit et al. 2009) and leading framework of contemporary theorization on the composition of psychological distance (Williams and Bargh 2008). The reviewed literature finds converging evidence for the CLT proposition that psychological distance, effected through temporal distance, spatial distance, social distance, or through hypotheticality, affects decision-makers' predictions, evaluations, and behavior; and that those effects are mediated by the degree of abstractness with which objects, persons, situations, or events are mentally presented. Psychological distance effects on prediction include variation in the degree of confidence with which predictions are rendered and variation in the degree of correspondence bias. Psychological distance effects on evaluation (or judgment/preference/perception) include variations in the consideration of *primary* versus *secondary* features; *desirability* versus *feasibility* concerns; *pros* versus *cons*; *idealistic* versus *pragmatic* concerns; and *alignable* versus *non-alignable* features. Lastly, psychological distance effects on behavior include variations in forecasting intentions from values and overall attitudes, logrolling willingness in negotiation, exertion of self-control, performance on abstract vs. concrete tasks, susceptibility to the sunk-cost bias, perception of risk and time frame, and client impatience. Given those findings, as accounting, auditing, and business in general becomes increasingly global and geographically dispersed, behavioral accounting researchers should no longer ignore the predictions and insights provided by CLT. Accounting professionals, organizational actors, and other decision-makers who rely on accounting information regularly predict situations, express preferences, evaluate situations, or act upon considerations that encompass varying degrees of psychological distance. Specific CLT propositions about *how* those predictions,

evaluations, and behaviors are influenced by psychological distance should therefore enable accounting researchers to gain a deeper understanding of the heuristics and biases associated with judgment and decision-making in distance-affected decision environments.

As is evident from the discussion of the reviewed accounting papers, CLT research in the accounting domain has just recently emerged. Moreover, extant CLT-based accounting research is not only limited with respect to applied accounting domains (i.e., financial accounting, managerial accounting, and auditing), but also with respect to psychological distance dimensions (i.e., spatial and temporal distance). This literature review argues that a host of research questions spanning multiple accounting domains and psychological distance dimensions await exploration by behavioral accounting researchers. This research strives to illustrate how CLT, through its focus on mediating cognitive mechanisms, may offer accounting academicians the opportunity to gain a deeper understanding of the predictions, judgments, preferences, perceptions, evaluations, and behaviors of accounting professionals, corporate managers, and (non-) professional investors. To this end, several broad research questions related to various accounting disciplines are put forward.

Throughout the article, the theory's underlying logic is explained and commonalities and differences between CLT and related or competing theories in terms of their prediction and focus are highlighted. By documenting interesting and frequently applied experimental manipulations and providing a variety of research questions, this research hopes to motivate behavioral accounting researchers to consider CLT as a basis for exploring critical research questions in the judgment and decision-making domain.

## References

- Agrawal, N., and E. W. Wan. 2009. Regulating risk or risking regulation? Construal levels and depletion effects in the processing of health messages. *Journal of Consumer Research* 36 (3): 448-462.
- Alter, A. L., D. M. Oppenheimer, and J. C. Zemla. 2010. Missing the trees for the forest: A construal level account of the illusion of explanatory depth. *Journal of Personality and Social Psychology* 99 (3): 436-451.
- Amit, E., C. Wakslak, and Y. Trope. 2013. The use of visual and verbal means of communication across psychological distance. *Personality and Social Psychology Bulletin* 39 (1): 43-56.
- Amit, E., D. Algom, and Y. Trope. 2009. Distance-dependent processing of pictures and words. *Journal of Experimental Psychology: General* 138 (3): 400-415.
- Backof, A. G., E. M. Bamber, and T. D. Carpenter. 2013. More precise versus less precise accounting standards: The effect of auditor judgment frameworks in constraining aggressive reporting. Working Paper. Available at <https://exceed.mcombs.utexas.edu/~media/Files/MSB/Departments/Accounting/Brownbag%20papers/CarpenterPaper.PDF>.
- Backof, A. G., J. M. Thayer, and T. Carpenter. 2014. Auditing complex estimates: Management-provided evidence and auditors' consideration of inconsistent evidence. Working Paper. Available at SSRN: <http://ssrn.com/abstract=2279138>.
- Bar-Anan, Y., N. Liberman, and Y. Trope. 2006. The association between psychological distance and construal level: Evidence from an implicit association test. *Journal of Experimental Psychology: General* 135 (4): 609-622.
- Bar-Anan, Y., Y. Trope, N. Liberman, and D. Algom. 2007. Automatic processing of psychological distance: Evidence from a stroop task. *Journal of Experimental Psychology: General* 136 (4): 610-622.
- Barreto, I., and D. L. Patient. 2013. Toward a theory of intraorganizational attention based on desirability and feasibility factors. *Strategic Management Journal* 34 (6): 687-703.
- Bonner, C., and B. R. Newell. 2008. How to make a risk seem riskier: The ratio bias versus construal level theory. *Judgment and Decision Making* 3 (5): 411-416.
- Borovoi, L., N. Liberman, and Y. Trope. 2010. The effects of attractive but unattainable alternatives on the attractiveness of near and distant future menus. *Judgment and Decision Making* 5 (2): 102-109.

- Cantor, D. E., and J. R. Macdonald. 2009. Decision-making in the supply chain: Examining problem solving approaches and information availability. *Journal of Operations Management* 27 (3): 220-232.
- Cha, M., and J. Park. 2014. Effects of team member psychological proximity on teamwork performance. *Team Performance Management* 20 (1/2): 81-96.
- Chandran, S., and G. Menon. 2004. When a day means more than a year: Effects of temporal framing on judgments of health risk. *Journal of Consumer Research* 31 (2): 375-389.
- Day, S. B., and D. M. Bartels. 2008. Representation over time: The effects of temporal distance on similarity. *Cognition* 106 (3): 1504-1513.
- DeDreu, C. K. W., M. Giacomantonio, S. Shalvi, and D. Sligte. 2009. Getting stuck or stepping back: Effects of obstacles and construal level in the negotiation of creative solutions. *Journal of Experimental Social Psychology* 45 (3): 542-548.
- Dutton, J. E., L. Fahey, and V. K. Narayanan. 1983. Toward understanding strategic issue diagnosis. *Strategic Management Journal* 4 (4): 307-323.
- Ekstrom, R. B., J.W. French, H. H. Harman, H. H., and D. Derman. 1976. *Kit of factor-referenced cognitive tests*. Princeton, NJ: Educational Testing Service.
- Elliott, W. B., F. D. Hodge, and L. M. Sedor. 2012. Using online video to announce a restatement: Influences on investment decisions and the mediating role of trust. *The Accounting Review* 87 (2): 513-535.
- Elliott, W. B., K. M. Rennekamp, and B. J. White. 2014. Does concrete language in disclosures increase willingness to invest? *Review of Accounting Studies*: 1-27.
- Elliott, W. B., S. M. Grant, and K. M. Rennekamp. 2015. How disclosure features of corporate social responsibility reports interact with investor numeracy to influence investor judgment. Working Paper. Available at SSRN: <http://ssrn.com/abstract=2425731>.
- Eyal, T., M. D. Sagristano, Y. Trope, N. Liberman, and S. Chaiken. 2009. When values matter: Expressing values in behavioral intentions for the near vs. distant future. *Journal of Experimental Social Psychology* 45 (1): 35-43.
- Eyal, T., N. Liberman, and Y. Trope. 2008. Judging near and distant virtue and vice. *Journal of Experimental Social Psychology* 44 (4): 1204-1209.
- Eyal, T., N. Liberman, Y. Trope, and E. Walther. 2004. The pros and cons of temporally near and distant action. *Journal of Personality and Social Psychology* 86 (6): 781-795.

- Fiedler, K. 2007. Construal level theory as an integrative framework for behavioral decision-making research and consumer psychology. *Journal of Consumer Psychology* 17 (2): 101-106.
- Fiedler, K., J. Jung, M. Wänke, and T. Alexopoulos. 2012. On the relations between distinct aspects of psychological distance: An ecological basis of construal-level theory. *Journal of Experimental Social Psychology* 48 (5): 1014-1021.
- Förster, J. 2009. Cognitive consequences of novelty and familiarity: How mere exposure influences level of construal. *Journal of Experimental Social Psychology* 45 (2): 444-447.
- Förster, J., R. Friedman, and N. Liberman. 2004. Temporal construal effects on abstract and concrete thinking: Consequences for insight and creative cognition. *Journal of Personality and Social Psychology* 87 (2): 177-189.
- Frederick, S., G. Loewenstein, and T. O'Donoghue. 2002. Time discounting and time preference: A critical review. *Journal of Economic Literature* 40 (2): 351-401.
- Freitas, A. L., P. Salovey, and N. Liberman. 2001. Abstract and concrete self-evaluative goals. *Journal of Personality and Social Psychology* 80: 410-424.
- Freitas, A. L., K. L. Langsam, S. Clark, and S. J. Moeller. 2008. Seeing oneself in one's choices: Construal level and self-pertinence of electoral and consumer decisions. *Journal of Experimental Social Psychology* 44 (4): 1174-1179.
- Freitas, A. L., P. Gollwitzer, and Y. Trope. 2004. The influence of abstract and concrete mindsets on anticipating and guiding others' self-regulatory efforts. *Journal of Experimental Social Psychology* 40 (6): 739-752.
- Fujita, K. 2008. Seeing the forest beyond the trees: A construal level approach to self-control. *Social and Personality Psychology Compass* 2 (3): 1475-1496.
- Fujita, K., and H. A. Han. 2009. Moving beyond deliberative control of impulses. The effect of construal levels on evaluative associations in self-control conflicts. *Psychological Science* 20 (7): 799-804.
- Fujita, K., and J. J. Carnevale. 2012. Transcending temptation through abstraction: The role of construal level in self-control. *Current Directions in Psychological Science* 21 (4): 248-252.
- Fujita, K., M. D. Henderson, J. Eng, Y. Trope, and N. Liberman. 2006a. Spatial distance and mental construal of social events. *Psychological Science* 17 (4): 278-282.
- Fujita, K., T. Eyal, S. Chaiken, Y. Trope, and N. Liberman. 2008. Influencing attitudes toward near and distant objects. *Journal of Experimental Social Psychology* 44 (3): 562-572.

- Fujita, K., Y. Trope, N. Liberman, and M. Levin-Sagi. 2006b. Construal levels and self-control. *Journal of Personality and Social Psychology* 90 (3): 351-367.
- Gollwitzer, P. M. 1990. Action phases and mindsets. In E.T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53-92). New York: Guilford Press.
- Hamilton, R. W., and D. V. Thompson. 2007. Is there a substitute for direct experience? Comparing consumers' preferences after direct and indirect product experiences. *Journal of Consumer Research* 34 (4): 546-555.
- Hansen, J., and Y. Trope. 2013. When time flies: How abstract and concrete mental construal affect the perception of time. *Journal of Experimental Psychology: General* 142 (2): 336-347.
- Hardin, G. 1968. Tragedy of the commons. *Science* 162 (3859): 1243-1248.
- Henderson, M. D. 2011. Mere physical distance and integrative agreements: When more space improves negotiation outcomes. *Journal of Experimental Social Psychology* 47 (1): 7-15.
- Henderson, M. D., and C. J. Wakslak. 2010. Over the hills and far away: The link between physical distance and abstraction. *Current Directions in Psychological Science* 19 (6): 390 - 394.
- Henderson, M. D., C. J. Wakslak, K. Fujita, and J. Rohrbach. 2011. Construal level theory and spatial distance: Implications for mental representation, judgment, and behavior. *Social Psychology* 42 (3): 165-173.
- Henderson, M. D., K. Fujita, Y. Trope, and N. Liberman. 2006a. Transcending the "here": The effect of spatial distance on social judgment. *Journal of Personality and Social Psychology* 91 (5): 845-856.
- Henderson, M. D., Y. Trope, and P.J. Carnevale. 2006b. Negotiation from a near and distant time perspective. *Journal of Personality and Social Psychology* 91 (4): 712-729.
- Herzog, S. M., J. Hansen, and M. Wänke. 2007. Temporal distance and ease of retrieval. *Journal of Experimental Social Psychology* 43 (3): 483-488.
- Jia, L., E. R. Hirt, and S. C. Karpen. 2009. Lessons from a faraway land: The effect of spatial distance on creative cognition. *Journal of Experimental Social Psychology* 45 (5): 1127-1131.

- Jones, E. E., and R. E. Nisbett. 1972. The actor and the observer: Divergent perceptions of the causes of behavior. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior* (pp. 79-94). Morristown, NJ: General Learning Press.
- Kahneman, D., and A. Tversky. 1979. Prospect theory: An analysis of decision under risk. *Econometrica* 47 (2): 263-291.
- Kim, H., A. R. Rao, and A. Y. Lee. 2009. It's time to vote: The effect of matching message orientation and temporal frame on political persuasion. *Journal of Consumer Research* 35 (6): 877-889.
- Kim, H., S. Schnall, D. Yi, and M. P. White. 2013. Social distance decreases responders' sensitivity to fairness in the ultimatum game. *Judgment and Decision Making* 8 (5):632-638.
- Kim, K., M. Zhang, and X. Li. 2008. Effects of temporal and social distance on consumer evaluations. *Journal of Consumer Research* 35 (4): 706-713.
- Kivetz, Y. and T. R. Tyler. 2007. Tomorrow I'll be me: The effect of time perspective on the activation of idealistic versus pragmatic selves. *Organizational Behavior and Human Decision Processes* 102 (2): 193-211.
- Köhler, C. F., E. Breugelmans, and B. G. C. Dellaert. 2011. Consumer acceptance of recommendations by interactive decision aids: The joint role of temporal distance and concrete versus abstract communications. *Journal of Management Information Systems* 27 (4): 231-260.
- Koonce, L., N. Sybert, and J. Smith. 2011. Causal reasoning in financial reporting and voluntary disclosure. *Accounting, Organizations and Society* 36 (4-5): 209-225.
- Ledgerwood, A., Y. Trope, and N. Liberman. 2010. Chapter 6 - Flexibility and consistency in evaluative responding: The function of construal level. *Advances in Experimental Social Psychology* 43: 257-295.
- Leiser, D., O. H. Azar, and L. Hadar. 2008. Psychological construal of economic behavior. *Journal of Economic Psychology* 29 (5): 762-776.
- Lewin, K. 1951. *Field theory in social science: Selected theoretical papers*. D. Cartwright (Ed.), New York: Harper & Row.
- Liberman, N., and J. Förster. 2009. The effect of psychological distance on perceptual level of construal. *Cognitive Science* 33 (7): 1330-1341.

- Liberman, N., and Y. Trope. 1998. The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology* 75 (1): 5-18.
- Liberman, N., and Y. Trope. 2008. The psychology of transcending the here and now. *Science* 322 (5905): 1201-1205.
- Liberman, N., M. D. Sagristano, and Y. Trope. 2002. The effect of temporal distance on level of mental construal. *Journal of Experimental Social Psychology* 38: 523-534.
- Liberman, N., Y. Trope, and C. Wakslak. 2007a. Construal level theory and consumer behavior. *Journal of Consumer Psychology* 17 (2): 113-117.
- Liberman, N., Y. Trope, S. M. McCrea, and S. J. Sherman. 2007b. The effect of level of construal on the temporal distance of activity enactment. *Journal of Experimental Social Psychology* 43 (1): 143-149.
- Liberman, N., Y. Trope, and E. Stephan. 2007c. Psychological distance. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2, pp. 353-383). New York, NY: Guilford Press.
- Liviatan, I., Y. Trope, and N. Liberman. 2008. Interpersonal similarity as a social distance dimension: Implications for perception of others' actions. *Journal of Experimental Social Psychology* 44 (5): 1256-1269.
- Loewenstein, G. F. 1996. Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes* 65 (3): 272-292.
- Lundholm, R. J., R. Rogo, and J. L. Zhang. 2014. Restoring the tower of Babel: How foreign firms communicate with U.S. investors. *The Accounting Review* 89 (4): 1453-1485.
- Lynch, J. G., Jr., and G. Zauberman. 2007. Construing Consumer Decision Making. *Journal of Consumer Psychology* 17 (2): 107-112.
- Magee, J. C., G. J. Kilduff, and C. Heath. 2011. On the folly of principal's power: Managerial psychology as a cause of bad incentives. *Research in Organizational Behavior* (31): 25-41.
- Maglio, S. J., Y. Trope, and N. Liberman. 2013. Distance from a distance: Psychological distance reduces sensitivity to any further psychological distance. *Journal of Experimental Psychology: General* 142 (3): 644-657.
- Malkoc, S. A., G. Zauberman, and C. Ulu. 2005. Consuming now or later? The interactive effect of timing and attribute alignability. *Psychological Science* 16 (5): 411-417.



- Malkoc, S. A., G. Zauberman, and J. R. Bettman. 2010. Unstuck from the concrete: Carryover effects of abstract mindsets in intertemporal preferences. *Organizational Behavior and Human Decision Processes* 113 (2): 112-126.
- Markman, A. B., and D. Gentner. 1993. Splitting the differences: A structural alignment view of similarity. *Journal of Memory and Language* 32 (4): 517-535.
- McCrea, S. M., N. Liberman, Y. Trope, and S. J. Sherman. 2008. Construal level and procrastination. *Psychological Science* 19 (12): 1308-1314.
- McPhee, G. 2014. The effects of tangible rewards, payoff timing, and task type on performance. Working Paper. Florida International University.
- Miller, N. E. 1944. Experimental studies of conflict. In J. McV. Hunt (Ed.), *Personality and the behavior disorders* (Vol. 1, pp. 431-465). New York: Ronald Press.
- Nussbaum, S., N. Liberman, and Y. Trope. 2006. Predicting the near and distant future. *Journal of Experimental Psychology: General* 135 (2): 152-161.
- Nussbaum, S., Y. Trope, and N. Liberman. 2003. Creeping dispositionism: The temporal dynamics of behavior prediction. *Journal of Personality and Social Psychology* 84 (3): 485-497.
- Ocasio, W. 1997. Towards an attention-based view of the firm. *Strategic Management Journal, Summer Special Issue* 18 (S1): 187-206.
- Park, J., and S. Jang. 2014. Sunk costs and travel cancellation: Focusing on temporal cost. *Tourism Management* 40: 425-435.
- Polman, E., and K. J. Emich. 2011. Decisions for others are more creative than decisions for the self. *Personality and Social Psychology Bulletin* 37 (4): 492-501.
- Rasso, J. T. 2014. Construal instructions and professional skepticism in evaluating complex estimates. Working Paper. Available at SSRN: <http://ssrn.com/abstract=2505531>
- Rim, S., J. S. Uleman, and Y. Trope. 2009. Spontaneous trait inference and construal level theory: Psychological distance increases nonconscious trait thinking. *Journal of Experimental Social Psychology* 45 (5): 1088-1097.
- Rogers, T., and M. H. Bazerman. 2008. Future lock-in: Future implementation increases selection of 'should' choices. *Organizational Behavior and Human Decision Processes* 106 (1): 1-20.
- Rozenblit, L. and F. C. Keil. 2002. The misunderstood limits of folk science: An illusion of explanatory depth. *Cognitive Science* 26 (5): 521-562.

- Sagrignano, M. D., Y. Trope, and N. Liberman. 2002. Time-dependent gambling: Odds now, money later. *Journal of Experimental Psychology: General* 131 (3): 364-376.
- Sanna, L. J., E. C. Chang, C. D. Parks, and L. A. Kennedy. 2009. Construing collective concerns. Increasing cooperation by broadening construals in social dilemmas. *Psychological Science* 20 (11): 1319-1321.
- Shani, Y., E. R. Igou, and M. Zeelenberg. 2009. Different ways of looking at unpleasant truths: How construal levels influence information search. *Organizational Behavior and Human Decision Processes* 110 (1): 36-44.
- Smith, P. K., and Y. Trope. 2006. You focus on the forest when you're in charge of the trees: Power priming and abstract information processing. *Journal of Personality and Social Psychology* 90 (4): 578-596.
- Stephan, E., N. Liberman, and Y. Trope. 2011. The effects of time perspective and level of construal on social distance. *Journal of Experimental Social Psychology* 47 (2): 397-402.
- Taylor, E. Z., and M. B. Curtis. 2013. Whistleblowing in audit firms: Organizational response and power distance. *Behavioral Research in Accounting* 25 (2): 21-43.
- Taylor, and S. K. Schneider. 1989. Coping and the simulation of events. *Social Cognition* 7 (2): 174-194.
- Todorov, A., A. Goren, and Y. Trope. 2007. Probability as a psychological distance: Construal and preferences. *Journal of Experimental Social Psychology* 43 (3): 473-482.
- Trope, Y. 2004. Theory in social psychology: Seeing the forest and the trees. *Personality and Social Psychology Review* 8 (2): 193-200.
- Trope, Y., and N. Liberman. 2000. Temporal construal and time-dependent changes in preference. *Journal of Personality and Social Psychology* 79 (6): 876-889.
- Trope, Y., and N. Liberman. 2003. Temporal construal. *Psychological Review* 110 (3): 403-421.
- Trope, Y., and N. Liberman. 2010. Construal-level theory of psychological distance. *Psychological Review* 117 (2): 440-463.
- Trope, Y., N. Liberman, and C. Wakslak. 2007. Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior. *Journal of Consumer Psychology* 17 (2): 83-95.
- Tumasjan, A., M. Strobel, and I. Welpel. 2011. Ethical leadership evaluations after moral transgression: Social distance makes the difference. *Journal of Business Ethics* 99 (4): 609-622.

- Vallacher, R. R. 1993. Mental calibration: Forging a working relationship between mind and action. In D. M. Wegner & J. W. Pennebaker (Eds.), *Handbook of mental control* (pp. 443-472). Englewood Cliffs, NJ: Prentice Hall.
- Vallacher, R. R., and D. M. Wegner. 1987. What do people think they're doing? Action identification and human behavior. *Psychological Review* 94 (1): 3-15.
- Vallacher, R. R., and D. M. Wegner. 1989. Levels of personal agency: Individual variation in action identification. *Journal of Personality and Social Psychology* 57 (4): 660-671.
- Wakslak, C. J. 2012. The where and when of likely and unlikely events. *Organizational Behavior and Human Decision Processes* 117 (1): 150-157.
- Wakslak, C. J., S. Nussbaum, N. Liberman, and Y. Trope. 2008. Representations of the self in the near and distant future. *Journal of Personality and Social Psychology* 95 (4): 757-773.
- Wakslak, C. J., Y. Trope, N. Liberman, and R. Alony. 2006. Seeing the forest when entry is unlikely: Probability and the mental representation of events. *Journal of Experimental Psychology: General* 135 (4): 641-653.
- Wakslak, C., and Y. Trope. 2009. The effect of construal level on subjective probability estimates. *Psychological Science* 20 (1): 52-58.
- Weber, E. U. 1994. From subjective probabilities to decision weights: The effect of asymmetric loss functions on the evaluation of uncertain outcomes and events. *Psychological Bulletin* 115 (2): 228-242.
- Weisner, M. M., and S. G. Sutton. 2015. When the world isn't always flat: The impact of psychological distance on auditors' reliance on specialists. *International Journal of Accounting Information Systems* 16: 23-41.
- White, B. J. 2014. How do fair value disclosures affect investors' judgments of estimate uncertainty and firm value? The role of investment horizon. Working Paper. Available at SSRN: <http://ssrn.com/abstract=2224077>.
- Wilson, J., C. B. Crisp, and M. Mortensen. 2013. Extending construal-level theory to distributed groups: Understanding the effects of virtuality. *Organization Science* 24 (2): 629-644.
- Zhao, M., S. Hoeffler, and G. Zauberan. 2007. Mental simulation and preference consistency over time: The role of process-versus outcome-focused thoughts. *Journal of Marketing Research* 44 (3): 379-388.

Tables

Table 1: Basic CLT Research & Related Syntheses

<b>Panel A: Basic Research</b>				
<b>Study</b>	<b>Construct(s) of Interest</b>	<b>Task</b>	<b>Key Methodological Implications</b>	<b>Primary Contribution(s)</b>
Liberman and Trope (1998)	Temporal distance	Consideration of desirability vs. feasibility aspects of a situation or event	Effects reflected in: <ul style="list-style-type: none"> <li>• activity / event description</li> <li>• choice</li> <li>• perceived importance</li> <li>• time planning</li> </ul>	<ul style="list-style-type: none"> <li>• The value assigned to high-level [low-level] considerations is weighted higher [lower] in distant future construals and grows over time [and is subject to temporal discounting].</li> <li>• Desirability considerations are more heavily weighted than feasibility concerns when decisions about distant future actions or plans are rendered.</li> </ul>
Trope and Liberman (2000)	Temporal distance	Indication of preferences for activities, objects, and events	<ul style="list-style-type: none"> <li>• Effects hold despite constant decision-relevant information</li> </ul>	<ul style="list-style-type: none"> <li>• Options that contain positive [negative] high-level construals but negative [positive] low-level construals are chosen [rejected] for the distant future.</li> <li>• Decisions may be regretted as the realization of the choice approaches.</li> </ul>
Liberman et al. (2002)	Temporal distance	Reflection on social experiences and situations	Effects reflected in: <ul style="list-style-type: none"> <li>• categorization</li> <li>• expectation of prototypical experiences</li> <li>• preferences</li> </ul>	<ul style="list-style-type: none"> <li>• Experiences and situations expected in the more distant future are construed more coherently and in more abstract, systematic, and simple terms.</li> </ul>

<b>Study</b>	<b>Construct(s) of Interest</b>	<b>Task</b>	<b>Key Methodological Implications</b>	<b>Primary Contribution(s)</b>
Bar-Anan et al. (2006)	Psychological distance	Implicit Association Test (Greenwald et al. 1998; Greenwald et al. 2002) (word-pairing task)	<ul style="list-style-type: none"> <li>• Association between level of construal and psychological distance exists in the absence of construal targets and their situation-specific context.</li> </ul>	<ul style="list-style-type: none"> <li>• Shows that the association between level of construal and psychological distance also exists on a pure conceptual level.</li> <li>• Individuals relate psychological proximity [distance] to low-level [high-level] construal to a greater degree than the other way around.</li> </ul>
Bar-Anan et al. (2007)	Psychological distance	Stroop task (Stroop, 1935) (picture-word version)	NA	<ul style="list-style-type: none"> <li>• Psychological distance is subconsciously activated regardless of its relevance to the required action and even in situations in which it potentially hinders performance</li> </ul>
Fiedler et al. (2012)	Psychological distance	Judge distance associated with imagined or recalled social behavior	<ul style="list-style-type: none"> <li>• Effects hold irrespective of whether imagined future situations or actually experienced past situations are evaluated.</li> </ul>	<ul style="list-style-type: none"> <li>• Consistent positive correlations among all distance dimensions, across decision-makers and decision targets exist.</li> </ul>
Maglio et al. (2013)	Psychological distance	Judgments and decisions reflecting sensitivity to a second instantiation of distance	<ul style="list-style-type: none"> <li>• Cross-dimensional distancing leads to same effects as within-dimensional distancing.</li> </ul>	<ul style="list-style-type: none"> <li>• A first instantiation of distance lowers sensitivity to additional distance instantiations.</li> <li>• Subjective sensitivity to a second distance dimension mediates the impact of the first distance dimension on choice.</li> </ul>

<b>Panel B: Syntheses &amp; Reevaluations of the State of CLT Research</b>				
<b>Study</b>	<b>Construct(s) of Interest</b>	<b>Task</b>	<b>Key Methodological Implications</b>	<b>Primary Contribution(s)</b>
Trope and Liberman (2003)	Temporal distance	NA	NA	<ul style="list-style-type: none"> <li>Summarizes theoretical insights and findings from previous studies and highlights explanatory shortcomings of competing explanations / theories.</li> <li>Suggests that construal level may determine perceived temporal distance (reverse causality).</li> <li>Proposes a joined theory of psychological distance (i.e., CLT).</li> </ul>
Trope (2004)	Temporal distance	NA	NA	<ul style="list-style-type: none"> <li>Explains that CLT conceptually integrates more restrictive theories and reconciles diverging results by accounting for both the discounting as well as the augmentation phenomena associated with temporal delay.</li> <li>Argues that CLT is broader in scope than existing time-perspective theories.</li> </ul>
Liberman et al. (2007a)	Psychological distance	NA	NA	<ul style="list-style-type: none"> <li>Discusses similarities, differences, and interactions among the four psychological distance dimensions.</li> </ul>
Liberman et al. (2007c)	Psychological distance; Construals	NA	NA	<ul style="list-style-type: none"> <li>Reviews CLT literature and provides detailed explanations of the psychological distance and level of construal concepts.</li> </ul>

<b>Study</b>	<b>Construct(s) of Interest</b>	<b>Task</b>	<b>Key Methodological Implications</b>	<b>Primary Contribution(s)</b>
Trope et al. (2007)	Psychological distance	NA	NA	<ul style="list-style-type: none"> <li>• Illustrates the association between psychological distance and (1) prediction; (2) evaluation; and (3) behavior.</li> </ul>
Liberman and Trope (2008)	Psychological distance	NA	NA	<ul style="list-style-type: none"> <li>• Emphasizes the bi-directional relationship between psychological distance and construal level.</li> </ul>
Ledgerwood et al. (2010)	Construal level	NA	NA	<ul style="list-style-type: none"> <li>• Explores the role of construal level on the consistency and flexibility of evaluations and the associated implications for social relations.</li> </ul>
Trope and Liberman (2010)	Psychological distance	NA	NA	<ul style="list-style-type: none"> <li>• Highlights the cognitive association among distance dimensions; their bidirectional relationship with level of construal; and their comparable effects on prediction, preferences, and behavior.</li> </ul>

<b>Panel C: Commentaries</b>				
<b>Study</b>	<b>Construct(s) of Interest</b>	<b>Task</b>	<b>Key Methodological Implications</b>	<b>Primary Contribution(s)</b>
Fiedler (2007)	Psychological distance	NA	NA	<ul style="list-style-type: none"> <li>• Highlights how CLT can explain preference reversals.</li> </ul>
Lynch and Zauberman (2007)	Psychological distance	NA	NA	<ul style="list-style-type: none"> <li>• Discusses the applicability of CLT to consumer decision-making.</li> </ul>

Table 2: Temporal Distance Research

Study	Task	Key Methodological Implications	Primary Contribution(s)
Sagrignano et al. (2002)	Gambling decision	<ul style="list-style-type: none"> <li>Results mirror those found in desirability vs. feasibility studies in which the outcome was controllable (see Liberman and Trope 1998).</li> </ul>	<ul style="list-style-type: none"> <li>Temporal distance raises [lowers] individuals' preferences for gambles with a low [high] probability of receiving a large [small] payoff.</li> <li>Decision-makers fail to render judgments consistent with the symmetry between payoffs and probability.</li> </ul>
Nussbaum et al. (2003)	Social prediction and attributional inference	NA	<ul style="list-style-type: none"> <li>Predictions about distant future behavior are characterized by:               <ul style="list-style-type: none"> <li>Greater correspondence bias</li> <li>Higher cross-situational consistency</li> <li>Greater reliance on dispositional factors.</li> </ul> </li> </ul>
Chandran and Menon (2004)	Self-risk assessment and indication of intentions to take preventive action	NA	<ul style="list-style-type: none"> <li>Self-positivity bias is moderated by temporal frames which, in turn, are moderated by the effort-intensity of preventive actions and the valence of associated consequences.</li> <li>A risk presented in a day [year] frame is construed as more proximal [distant] and specific [abstract], thereby increasing [decreasing] the efficacy of a risk communication that stresses negative outcomes.</li> </ul>
Eyal et al. (2004)	Generation of pro and con arguments	<ul style="list-style-type: none"> <li>Other drivers of construal level (e.g. desirability vs. feasibility features) may moderate the effects of pros versus cons on the level of construal.</li> </ul>	<ul style="list-style-type: none"> <li>The relative importance of pro and con aspects of a future activity is contingent on temporal distance such that the salience of pros [cons] is augmented [decreased] with temporal distance from a course of action.</li> </ul>



Study	Task	Key Methodological Implications	Primary Contribution(s)
Förster et al. (2004)	Insight task and generation of abstract solutions	<ul style="list-style-type: none"> <li>• Effects hold even when temporal distance is not directly manipulated (i.e., adopting a temporally distant perspective suffices).</li> </ul>	<ul style="list-style-type: none"> <li>• A distant time perspective simplifies [hinders] abstract [concrete] thinking, thereby facilitating [impeding] performance at creative [analytical] tasks.</li> </ul>
Malkoc et al. (2005)	Choice between two options; preference rating	<ul style="list-style-type: none"> <li>• Shows that temporal distance moderates the predictions derived from structural alignment theory (Markman &amp; Gentner, 1993).</li> </ul>	<ul style="list-style-type: none"> <li>• Abstract [concrete] construal, associated with the assessment of distant [near] future situations facilitates [hinders] processing of nonalignable aspects.</li> </ul>
Henderson et al. (2006b)	Negotiation	<ul style="list-style-type: none"> <li>• Temporal distance can relate to either negotiations themselves or the timing of the negotiated target event.</li> </ul>	<ul style="list-style-type: none"> <li>• A distant future oriented outlook encourages joint consideration of multiple negotiation points and more adequate, systematic concessions (i.e., it leads to integrative behavior and Pareto-efficient outcomes).</li> </ul>
Nussbaum et al. (2006)	Prediction	<ul style="list-style-type: none"> <li>• The level of construal moderates the impact of temporal distance on prediction confidence.</li> </ul>	<ul style="list-style-type: none"> <li>• When high certainty is attributed to high-level [low-level] construals, temporal distancing leads to [does not lead to] greater confidence in forecasting distant future outcomes.</li> </ul>
Herzog et al. (2007)	Generation of pro and con arguments	<ul style="list-style-type: none"> <li>• The impact of temporal distance on attitudes towards the action is mediated by the ease of retrieval.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals produce a fixed number of pro-arguments [counter-arguments] more easily when the activity relates to the distant [near] instead of the near [distant] future.</li> <li>• Individuals display a more favorable attitude towards actions related to the distant future.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Kivetz and Tyler (2007)	Indication of identity versus instrumental preferences	<ul style="list-style-type: none"> <li>The activated 'self' mediates the impact of temporal outlook on incentive preference.</li> </ul>	<ul style="list-style-type: none"> <li>A distant future orientation triggers the idealistic self, while a near future orientation triggers the pragmatic self.</li> <li>When the idealistic self is triggered, identity incentives (e.g. preferential treatment) gain in appeal, whereas when the pragmatic self is triggered, instrumental incentives (e.g. cash bonuses) become more attractive.</li> </ul>
Lieberman et al. (2007b)	Prediction of when a situation will occur	<ul style="list-style-type: none"> <li>Effects can be achieved by prompting individuals to consider an action's abstract attributes.</li> </ul>	<ul style="list-style-type: none"> <li>Individuals primed to adopt high-level [low-level] construals of a situation estimate the situation to occur in the distant [near] future.</li> </ul>
Zhao et al. (2007)	Choice and indication of preference	<ul style="list-style-type: none"> <li>Suggests a direct link between CLT and the two simulation types identified by mental simulation theory (Taylor and Schneider, 1989).</li> </ul>	<ul style="list-style-type: none"> <li>Process simulation [outcome simulation] prompts a low-level [high-level] construal, emphasizing the concrete [abstract] feasibility-relevant [desirability-relevant] features of an object or situation.</li> <li>Outcome [process] simulation can bring near [distant] future preferences closer to natural preferences for the distant [near] future.</li> </ul>
Bonner and Newell (2008)	Self-risk assessment	<ul style="list-style-type: none"> <li>CLT and the ratio bias offer opposing predictions with respect to risk frequency framing effects.</li> </ul>	<ul style="list-style-type: none"> <li>The ratio bias dominates the predictions derived from CLT (year framing results in greater perceived risk).</li> </ul>
Day and Bartels (2008)	Similarity perception	<ul style="list-style-type: none"> <li>Results are similar when temporal distance relates to the past.</li> </ul>	<ul style="list-style-type: none"> <li>Individuals judge situations with high-level [low-level], superordinate [subordinate] commonalities to be more alike when considered from a distant [near] future perspective.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Fujita et al. (2008)	Indication of an event's or product's appeal	<ul style="list-style-type: none"> <li>• Suggests that temporal distance moderates the previously taken-for-granted dominance of specific examples over classes with respect to persuasive impact.</li> </ul>	<ul style="list-style-type: none"> <li>• Communications emphasizing positive high-level attributes (e.g., primary attributes; desirability criteria; broad categories) have a larger influence on feelings toward attitude objects (e.g., a new college course) in the distal (as opposed to the proximate) future.</li> </ul>
McCrea et al. (2008)	Questionnaire completion	<ul style="list-style-type: none"> <li>• Effects are independent of task appeal, relevance, or perceived effort requirement.</li> </ul>	<ul style="list-style-type: none"> <li>• Participants are less inclined to postpone task performance when instructions trigger more concrete construals.</li> </ul>
Rogers and Bazerman (2008)	Indication of support for: public policy; donation; self-improvement	<ul style="list-style-type: none"> <li>• Changing individuals' temporal focus is sufficient to achieve a 'future-lock-in effect'.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals are more likely to favor 'should-choices' when those are to go into effect in the distant future, compared to the near future.</li> </ul>
De Dreu et al. (2009)	Negotiation	NA	<ul style="list-style-type: none"> <li>• Temporal distance facilitates overcoming of obstacles during negotiation.</li> <li>• Negotiation hurdles themselves do not prompt individuals to adopt a broader, more abstract approach to reasoning.</li> </ul>
Eyal et al. (2009)	Indication of likelihood to perform a given behavior	NA	<ul style="list-style-type: none"> <li>• Values [feasibility considerations] are a better predictor of temporally distant [proximate] behavioral intentions.</li> <li>• Plans for the distant future are more consistent across contexts than those for the more proximate future.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Kim et al. (2009)	Evaluation of a political message	<ul style="list-style-type: none"> <li>Effect is most pronounced for less informed participants.</li> </ul>	<ul style="list-style-type: none"> <li>Messages that emphasize abstract [concrete] why-aspects [how-aspects] are more persuasive in situations in which the decision concerns the distant [near] future than in situations in which the decision concerns the near [distant] future.</li> </ul>
Borovoi et al. (2010)	Assessment of alternative choices	NA	<ul style="list-style-type: none"> <li>The presence of an Attractive but Unattainable Alternative (AUA) interacts with temporal distance such that AUAs lower [do not lower and even elevate] the attractiveness of a set of alternatives when the choice set is considered for the near [distant] future.</li> </ul>
Malkoc et al. (2010)	Indication of timing preference (acceptance of delay)	<ul style="list-style-type: none"> <li>Identifies several new ways of manipulating construal mindset orientation</li> </ul>	<ul style="list-style-type: none"> <li>Present-bias is lower [higher] for individuals who have adopted a high-level [low-level] construal mindset.</li> <li>Mindset abstraction may be determined by the decision-maker's earlier tasks and judgments – even if unrelated to the intertemporal decision.</li> <li>A low-level construal mindset is the default.</li> </ul>
Köhler et al. (2011)	Evaluation of a Web-based interactive decision aid	<ul style="list-style-type: none"> <li>Shows that the congruency between communication design and time-dependent construal raises perceived transparency.</li> </ul>	<ul style="list-style-type: none"> <li>Interactive decision aid (IDA) performance evaluations are more positive when a concrete [abstract] communication design is matched with low [high] temporal distance between IDA recommendation and product or service consumption; or with immediate [delayed] advice delivery.</li> </ul>
Park and Jang (2014)	Indication of willingness to cancel travel plans	<ul style="list-style-type: none"> <li>Shows that prior experience moderates the identified effects.</li> </ul>	<ul style="list-style-type: none"> <li>Decision-makers consider large temporal distance from an anticipated event a sunk cost (independent of monetary sunk cost) which lowers their willingness to cancel the event.</li> </ul>

Table 3: Spatial Distance Research

Study	Task	Key Methodological Implications	Primary Contribution(s)
Fujita et al. (2006a)	Interpretation of social events	NA	<ul style="list-style-type: none"> <li>• Individuals prefer to identify behavior as ends [means to an end] when the behavior is thought to occur at a distant [nearby] location.</li> <li>• Purportedly distant [proximate] behavior is described in more abstract [concrete] terms.</li> </ul>
Henderson et al. (2006a)	Social judgments	NA	<ul style="list-style-type: none"> <li>• Prototypical [atypical] events are considered more [less] probable to occur at spatially more remote locations.</li> <li>• Evaluating spatially remote behavior leads to greater correspondence bias and broader categorization of observed behavior.</li> <li>• Individuals are less inclined to extrapolate from outlier data when rendering forecasts about spatially remote events.</li> </ul>
Jia et al. (2009)	Linguistic skills task; creative insight problems	<ul style="list-style-type: none"> <li>• Shows that a minimal cue may be sufficient to affect participants' creativity.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals offer more creative answers and insightful problem solutions when they are informed that the creativity task was developed at a remote location.</li> </ul>
Rim et al. (2009)	Recall of photo-word pairings	<ul style="list-style-type: none"> <li>• Priming via consideration of superordinate categories leads to similar effects.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals are more likely to generate spontaneous trait inferences when the observed behavior relates to a spatially (or temporally) distant other person.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Henderson and Wakslak (2010)	NA	NA	<ul style="list-style-type: none"> <li>• Synthesis of spatial distance research; suggests that future studies explore the unique impact of spatial distance, particularly in important contexts such as financial decision-making.</li> </ul>
Henderson (2011)	Negotiation	NA	<ul style="list-style-type: none"> <li>• Greater perceived spatial distance leads to more Pareto-efficient outcomes.</li> <li>• When participants are prompted to adopt a high-level construal mindset, spatial distance does not affect the achievement of integrative outcomes.</li> </ul>
Henderson et al. (2011)	NA	NA	<ul style="list-style-type: none"> <li>• Synthesis of research which describes the consequences of spatial distance with respect to construal, prediction, social judgment, and behavior; discusses research which has focused on the impact of construal on perceived spatial distance.</li> <li>• Provides suggestions for future research and discusses important covariates and unique aspects of the spatial distance dimension.</li> </ul>
Barreto and Patient (2013)	Interpretation of a situation in terms of opportunities and threats	<ul style="list-style-type: none"> <li>• Combines insights from the attention-based view of the firm (Ocasio, 1997), CLT, and strategic issue diagnosis theory (Dutton et al. 1983).</li> </ul>	<ul style="list-style-type: none"> <li>• Greater distance from an external shock and more optimistic organizational capability perceptions prompt managers to focus more on opportunities and less on threats associated with the external shock.</li> <li>• Shock distance (a superordinate aspect) and organizational capability perception (a subordinate aspect) are asymmetrically weighted.</li> </ul>

Table 4: Social Distance Research

Study	Task	Key Methodological Implications	Primary Contribution(s)
Kim et al. (2008)	Product evaluation	NA	<ul style="list-style-type: none"> <li>When both temporal and social distance are low [When either temporal or social distance (or both) are high], product assessments seem to be driven by the value attributed to the low-level [high-level] construals.</li> </ul>
Liviatan et al. (2008)	Perception and evaluation of other's actions and judgments (Behavioral Ident. Form, Vallacher and Wegner 1989)	<ul style="list-style-type: none"> <li>Shows that the impact of similarity on construal level is not dependent on motivation and affect.</li> </ul>	<ul style="list-style-type: none"> <li>Actions performed and judgments rendered by similar others are described and evaluated to a greater extent based on incidental, subordinate features relative to core, superordinate features.</li> <li>Actions of a similar individual are judged to be driven less by desirability and more by feasibility considerations.</li> </ul>
Polman and Emich (2011)	Imagination task; generation of creative ideas; creative problem solving task	NA	<ul style="list-style-type: none"> <li>Individuals who are asked to solve problems that require creativity perform better when instructed to act on behalf of others than when instructed to act for themselves.</li> </ul>
Stephan et al. (2011)	Indication of similarity perception; dictator game	NA	<ul style="list-style-type: none"> <li>Increased temporal distance from a social encounter and more abstract construal of target person lead to perceptions of increased social distance from the target individual.</li> <li>Decision-makers are less willing to allocate resources to individuals who are construed in more abstract terms.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Tumasjan et al. (2011)	Ethical leadership assessment	Moral reasoning fully mediates the effect of social distance on ethical leadership evaluation.	<ul style="list-style-type: none"> <li>• Increased consideration of contextual information associated with the evaluation of a socially proximate leader prompts better ethical leadership ratings.</li> <li>• Higher moral evaluations following an ethical transgression correlate with a more positive evaluation of the leader-subordinate relationship.</li> </ul>
Kim et al. (2013)	Ultimatum game	NA	<ul style="list-style-type: none"> <li>• Individuals are less likely to reject unfair offers when they render decisions on behalf of a socially distant other than when they make decisions for either themselves or a close acquaintance.</li> </ul>



Table 5: Hypotheticality Research

Study	Task	Key Methodological Implications	Primary Contribution(s)
Wakslak et al. (2006)	Categorization / segmentation; visual processing tasks	<ul style="list-style-type: none"> <li>• Effects hold even under circumstances in which individuals have identical knowledge about unlikely and likely events.</li> </ul>	<ul style="list-style-type: none"> <li>• Probability is inversely related to level of construal: unlikely events cause individuals to focus on an event's abstract, superordinate aspects while more likely events draw attention to detail-level, subordinate aspects.</li> </ul>
Todorov et al. (2007)	Choice among potential outcomes / rewards.	<ul style="list-style-type: none"> <li>• Means-related features are judgment-relevant only in high probability situations; however, variations in probability are irrelevant in joint evaluations.</li> </ul>	<ul style="list-style-type: none"> <li>• Desirability concerns are more prominent than feasibility concerns when the probability of an outcome is low.</li> <li>• As outcome probability rises, feasibility concerns may become even more prominent (but not less) than desirability concerns.</li> </ul>
Wakslak and Trope (2009)	Probability judgments	NA	<ul style="list-style-type: none"> <li>• An abstract mindset fosters the perception of improbability whereas a concrete mindset fosters the perception of likelihood.</li> </ul>
Wakslak (2012)	Gambling decisions; indication of occurrence expectations	<ul style="list-style-type: none"> <li>• Effects are demonstrated in both within-subjects and between-subjects experimental designs</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals expect that less [more] likely events happen at remote [proximate] locations and in the distant [near] future.</li> </ul>

Table 6: Construal Mindset Orientation Research

Study	Task	Key Methodological Implications	Primary Contribution(s)
Freitas et al. (2001)	Indication of preference for feedback type	NA	<ul style="list-style-type: none"> <li>• Individuals who adopt a high-level [low-level] construal mindset seek realistic [positive – i.e., downward social comparison] feedback.</li> </ul>
Freitas et al. (2004)	Predictions and recommendations related to other individuals' self-regulatory preferences and behaviors	<ul style="list-style-type: none"> <li>• Shows that prompting individuals to reflect on the 'why' ['how'] aspects of an activity induces an abstract [concrete] mindset orientation.</li> </ul>	<ul style="list-style-type: none"> <li>• An abstract mindset orientation leads individuals to predict and recommend to a greater degree that other individuals seek realistic instead of excessively positive self-relevant feedback.</li> </ul>
Fujita et al. (2006b)	Reaction to temptations and indication of self-control intentions	<ul style="list-style-type: none"> <li>• Shows that how the mindset orientation is initiated is irrelevant.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals who consider situations concretely [abstractly] turn more short-sighted [exhibit more self-control] and behave in line with lower-level [higher-level] concerns.</li> </ul>
Smith and Trope (2006)	Categorization task; detection of relationships and patterns; Gestalt Completion Task (Ekstrom et al. 1976)	<ul style="list-style-type: none"> <li>• Offers initial neuropsychological evidence in support of their results.</li> </ul>	<ul style="list-style-type: none"> <li>• High-power primed individuals (compared to low-power primed individuals)               <ul style="list-style-type: none"> <li>○ are better at extracting the core elements from presented data with a focus on critical issues and the detection of structural relationships</li> <li>○ group data into broader categories.</li> </ul> </li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Hamilton and Thompson (2007)	Product evaluation	NA	<ul style="list-style-type: none"> <li>• Preferences based on direct and indirect experiences (i.e., greater focus on feasibility and desirability attributes, respectively) converge when individuals are prompted to adopt a low-level construal prior to their indirect product experience.</li> <li>• Increasing social distance (i.e. selecting a product for another person) reduces the difference between preferences based on direct versus indirect product experience.</li> </ul>
Eyal et al. (2008)	Evaluation of morally questionable scenarios	<ul style="list-style-type: none"> <li>• Shows that psychological distance moderates the impact of common moral values on judgments.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals evaluate moral [immoral] actions as more virtuous [objectionable] when the actions are psychological distant rather than proximate.</li> </ul>
Freitas et al. (2008)	Indication of voting behavior and evaluation of advertisements	NA	<ul style="list-style-type: none"> <li>• Desiring for oneself the characteristics of a political candidate predicts positive assessment and voting for that candidate more among individuals who hold a distant future perspective.</li> <li>• Individuals who inherently construe activities at high levels react positively to commercials which appealed to their preferred self-image.</li> </ul>
Leiser et al. (2008)	NA	NA	<ul style="list-style-type: none"> <li>• Synthesizes CLT studies which have direct implications for economic decision-making and identifies associated research opportunities.</li> </ul>
Agrawal and Wan (2009)	Reading health-related articles	<ul style="list-style-type: none"> <li>• Shows that a focus on goal achievement mediates the effect of resource depletion on subsequent self-control.</li> </ul>	<ul style="list-style-type: none"> <li>• The negative impact of resource depletion on individuals' ability to exercise self-control is only evident among those who adopt a low-level construal mindset.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Amit et al. (2009a)	Timed classification task	NA	<ul style="list-style-type: none"> <li>• Pictures [words] are more suitable for the representation of psychologically proximate [distant] targets.</li> </ul>
Cantor and Macdonald (2009)	Supply-chain game	NA	<ul style="list-style-type: none"> <li>• Individuals who adopt an abstract problem-solving style outperform those who adopt a concrete problem-solving style when a limited amount of information is available.</li> </ul>
Förster (2009)	Symbol recognition task; invention of meanings associated with symbols	<ul style="list-style-type: none"> <li>• Suggests that abstract construal facilitates integration of a new situation with existing knowledge structures.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of familiarity promotes abstract, high-level construal whereas acquaintance promotes detailed, low-level construals.</li> </ul>
Fujita and Han (2009)	Indication of preference for one of two food choices	NA	<ul style="list-style-type: none"> <li>• Temptations construed at a higher level are perceived to be more negative than those construed at a lower level, thus facilitating the exertion of self-control.</li> </ul>
Lieberman and Förster (2009)	Navon's task (Navon 1977)	<ul style="list-style-type: none"> <li>• Shows a perceptual relationship between psychological distance and construal level.</li> </ul>	<ul style="list-style-type: none"> <li>• Priming with temporal, spatial, or social distances [proximity] makes it easier [harder] to attend to global features and harder [easier] to attend to specific details in a visual task.</li> </ul>
Sanna et al. (2009)	Social dilemma scenario (overfishing)	NA	<ul style="list-style-type: none"> <li>• High-level construal of a social dilemma scenario leads to greater cooperation.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Shani et al. (2009)	Indication of preference for additional information	<ul style="list-style-type: none"> <li>• Suggests that the emotional goal of alleviating negative feelings mediates the impact of construal level on information search.</li> </ul>	<ul style="list-style-type: none"> <li>• Lower-level [higher-level] construal promotes [lowers] information search desirability in situations that involve the potential discovery of unpleasant truths about prior decisions.</li> </ul>
Alter et al. (2010)	Explain how various objects work and rate own understanding	<ul style="list-style-type: none"> <li>• Suggests a link between the illusion of explanatory depth (IOED) (e.g. Rozenblit and Keil, 2002) and CLT.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals who have adopted a high-level construal style may mistakenly believe that they possess detail-level knowledge.</li> <li>• Encouraging people to adopt a lower level perspective may prompt them to search for further information which then may lead to better decision-making.</li> </ul>
Magee et al. (2011)	NA	NA	<ul style="list-style-type: none"> <li>• Power seems to have a detrimental effect on managers' capability to design proper incentive systems.</li> <li>• Power-induced abstract construal promotes a focus on desirability aspects and organizational goals over those related to feasibility and subordinates' potential reactions to the proposed incentives.</li> </ul>
Fujita and Carnevale (2012)	NA	NA	<ul style="list-style-type: none"> <li>• Synthesizes self-control literature and identifies personal attitudes and asymmetric associations between goals and temptations as mechanisms through which high-level construals can enhance self-control.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
Amit et al. (2013)	Indication of preference for either verbal or pictorial communication	<ul style="list-style-type: none"> <li>• Illustrates that individuals consider their communication target's perspective when selecting a communication medium.</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals' relative preference of words over pictures escalates with increased psychological distance from the message recipient.</li> <li>• The available communication medium affects preference for communicating with a proximal [for pictorial messages] or distant [for verbal messages] recipient.</li> <li>• Message – distance congruency promotes advice taking.</li> </ul>
Hansen and Trope (2013)	Estimation of time elapsed while performing a task / watching a presentation	<ul style="list-style-type: none"> <li>• Suggests implications associated with time-related phenomena, such as planning, assessments, and performance.</li> </ul>	<ul style="list-style-type: none"> <li>• Variation of high-level [low-level] features of a situation prompts individuals with an abstract [concrete] mindset to perceive time as passing quicker.</li> </ul>
Wilson et al. (2013)	NA	NA	<ul style="list-style-type: none"> <li>• Introduces extended CLT framework and compares CLT to competing theories used in distributed (virtual) team research.</li> <li>• Identifies - in the context of virtual teams - contextual moderators of the relationship between objective distance and psychological distance.</li> </ul>
Cha and Park (2014)	NA - Survey	NA	<ul style="list-style-type: none"> <li>• Proximity along various psychological distance dimensions has beneficial effects on both teamwork quality and performance.</li> <li>• Spatial, temporal, and social distance not only affect different teamwork quality factors (i.e., team communication, coordination, collaboration, and cohesion), but also vary with respect to their strength of impact.</li> </ul>

Table 7: CLT-Informed Accounting Studies

Study	Task	Key Methodological Implications	Primary Contribution(s)
Backof et al. (2013)	Indicate choice of most acceptable accounting method	<ul style="list-style-type: none"> <li>Shows that a deliberative mindset can be achieved by prompting auditors to ask <i>why</i>-questions related to a transaction.</li> </ul>	<ul style="list-style-type: none"> <li>Increased psychological distance improves auditors' judgment quality by drawing attention towards the economic substance of a transaction.</li> </ul>
White (2014)	Judge uncertainty associated with fair value disclosures	NA	<ul style="list-style-type: none"> <li>Investors with a short-term investment horizon, compared to those with a long-term investment horizon, exhibit greater sensitivity to variations in fair value input level and related measurement disclosures when assessing the uncertainty associated with a disclosed estimate.</li> <li>Sensitivity to uncertainty and related disclosures affects judgments of overall firm value, potentially leading to biases in investor decision-making.</li> </ul>
Backof et al. (2014)	Assess reasonableness of management's fair value estimate	<ul style="list-style-type: none"> <li>Shows that the consideration of <i>how</i>-questions can serve as an effective debiasing mechanism.</li> </ul>	<ul style="list-style-type: none"> <li>Graphical presentation of audit evidence, compared to verbal presentation, facilitates the detection of trend deviations and makes it easier to spot evidence that contradicts management's aggressive assumptions.</li> <li>Skepticism is highest when a low-level construal judgment framework is combined with the examination of graphically presented evidence.</li> </ul>
Elliott et al. (2014)	Reveal comfort in ability to evaluate a firm and indicate willingness to invest	NA	<ul style="list-style-type: none"> <li>Investors are more willing to invest in a firm when concrete language, rather than abstract language, is highlighted in an investment prospectus - particularly when the spatial distance between investor and firm is large.</li> <li>Psychological distance is associated lower investor comfort.</li> </ul>

Study	Task	Key Methodological Implications	Primary Contribution(s)
McPhee (2014)	Decoding task; creative word association task	NA	<ul style="list-style-type: none"> <li>• Promising cash incentives to be paid the near future is most suitable for motivating high performance on an analytical task.</li> <li>• Promising non-cash incentives to be awarded in the distant future is equally effective as a cash incentive promised for the near future for motivating high performance on a creative task.</li> </ul>
Lundholm et al. (2014)	N/A - Archival	<ul style="list-style-type: none"> <li>• Shows how textual analysis can be used to infer the effect of a message on readers' construal level.</li> </ul>	<ul style="list-style-type: none"> <li>• Foreign firms can lower potential U.S. investors' psychological distance by providing more concrete and more readable disclosures.</li> <li>• MD&amp;A and press release readability as well as the use of numbers within those publications increases with geographic distance from the U.S.</li> </ul>
Rasso (2014)	Collect and review audit evidence to determine reasonableness of client's fair value estimate	<ul style="list-style-type: none"> <li>• Illustrates how simple audit documentation instructions can improve auditor skepticism when incomplete evidence sets are evaluated.</li> </ul>	<ul style="list-style-type: none"> <li>• Documentation instructions that prompt abstract construal lead to higher professional skepticism and skeptical actions as evidenced by time spent on audit task and amount of evidence gathered.</li> <li>• Auditors who adopt an abstract [concrete] mindset orientation are more [less] effective in processing accumulated evidence and rate fair value estimates as more [less] risky.</li> </ul>
Elliott et al. (2015)	Evaluate a firm and indicate willingness to invest	<ul style="list-style-type: none"> <li>• Shows that processing fluency is particularly important for less numerate individuals.</li> </ul>	<ul style="list-style-type: none"> <li>• Corporate Social Responsibility (CSR) performance reports that properly match pursued corporate CSR strategy with communication style promote processing fluency and subsequently non-professional investors' willingness to invest.</li> </ul>
Weisner and Sutton (2015)	Indicate willingness to rely on a management appointed specialist	<ul style="list-style-type: none"> <li>• Develops and validates instruments to measure propensity toward spatial and cultural sensitivity.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased spatial distance between an audit client and a management-appointed, teleworking specialist reduces auditors' reliance on the work of the specialist.</li> <li>• Reliance is lowest when the auditor's prior experience with his client's internal audit function (IAF) indicates a weak IAF.</li> </ul>



## **STUDY TWO: THE IMPACT OF CONSTRUAL MINDSET ORIENTATION ON AUDITORS' PROBABILITY ASSESSMENT**

### Introduction

Working on multiple tasks and multiple clients within a single work session is a prevailing reality in the assurance service industry. Bhattacharjee et al. (2013) draw attention to the profound effects of such work environments on audit professionals' decision-making and subsequent implications for audit effectiveness and efficiency. The influence of task and client sequencing on auditor decisions is evident from the relatively recent, albeit limited stream of research by judgment and decision-making scholars who have identified undesirable carryover effects as a common form of information processing and recall-related errors. For example, O'Donnell and Schultz, Jr. (2005) illustrate in the context of performing *multiple tasks* for a *single client* how strategic risk assessment affects auditors' sensitivity toward account-level fluctuations that are inconsistent with their holistic evaluation of their client's business model. Other research has focused on performing *similar tasks* for *multiple clients* within a short period of time. While Bhattacharjee et al. (2007) find that exposure to comparable judgment information in a multiple-client setting promotes contrast effects, Lindberg and Maletta (2003) show that the likelihood of committing memory conjunction errors is a complex function of the relationship between the memory trace and its origin, its target for memory reconstruction purposes, and audit risk. Together, those studies provide converging evidence that working on multiple tasks and multiple clients within a short period of time affects auditors' judgments. However, the implications of such work environments on auditors' judgments in situations in which sequential tasks are neither related to the same client nor related in terms of domain-specific information has largely been ignored. This seems somewhat surprising given that the

likelihood that auditors face similar judgment tasks upon switching between clients or tasks seems far lower than the likelihood that they encounter dissimilar judgment tasks. To address this research gap, the current study focuses on the effects of task-induced mindset on subsequent decisions in a multi-task, multi-client environment in which two successive tasks are entirely unrelated with respect to the client for which they are performed and with respect to their particular nature.

The purpose of this research is to investigate how the degree of high-level (i.e., abstract) thinking associated with performing a task affects auditors' judgment on subsequent tasks, even when the latter is neither related to the same client nor to the domain of the original task. As such, the study follows Bhattacharjee et al.'s (2007) call for additional research on situations in which individuals render sequential judgments about diverse targets.

This study draws on construal level theory of psychological distance (CLT; Liberman and Trope 1998; Trope and Liberman 2003) in order to examine how the performance of common auditing tasks that require varying degrees of abstract thinking affects decision-makers' overall mindset and hence their subsequent judgments. CLT emphasizes the critical role of mental construal (i.e., mental representation) for individual judgment and decision-making and introduces the level of abstraction as a distinctive attribute of various mental construals (Fujita and Han 2009). Critical to the context of this study, Wakslak and Trope (2009) show that prompting abstract construals leads individuals to focus on the unlikelihood of a given event, thereby decreasing their assessment of the event's probability. The researchers conclude that an abstract mindset promotes perceptions of improbability whereas a concrete mindset imparts a sense of likelihood.

Based on Wakslak and Trope (2009), this study predicts that auditors who initially perform a task requiring high-level, abstract thinking [low-level, concrete thinking] adopt an abstract [concrete] mindset which subsequently affects their probability assessment associated with an unrelated task such that lower [higher] probabilities are assessed by participants who have adopted an abstract [concrete] mindset.<sup>7</sup> In line with CLT and contrary to normative expectations, it is further predicted that this result holds regardless of whether the probability assessment concerns the occurrence of an event or its complement (i.e., the probability of the event not occurring). This latter prediction is suggestive of a judgment bias in the abstract mindset orientation condition as evidenced by combined probability assessments (i.e., for the event and its complement) that do not sum to 1. As noted by Mandel (2005), the detection of “coherence violations [is] of practical value because, while it is true that coherent judgments do not imply accurate judgments, incoherent judgments do imply that, at best, only one of the judgments elicited may be accurate” (p. 286). Accordingly, the determinants of judgment coherence investigated in the present study inform forecasting accuracy despite the fact that the measurement of probability assessment accuracy is not the focal point of this study (Mandel 2005).

To test the predictions derived from CLT, two experiments are conducted, each following a  $2 \times 2$  between-subjects factorial design. Each experiment consists of two separate and

---

<sup>7</sup> In the audit context, considerations related to the distant future (e.g., planning / budgeting for next year’s busy season; evaluating the reasonableness of management’s long-term forecasts), judgments involving spatially remote decision-objects (e.g., going concern judgments related to foreign subsidiaries), tasks involving broad categorizations (e.g., deciding whether footnote-disclosed client segment information adequately reflects the organizational structure of the client), or tasks involving the consideration of overarching goals (e.g., considering the overall goal of a given audit procedure rather than the means by which the procedure will be performed) are examples of tasks that are expected to promote an abstract mindset orientation. In contrast, a concrete mindset orientation – which is the default (see Malkoc et al. 2010) – would prevail in situations where auditors focus on the details of a task (e.g., reconciling balances), render judgments about near future situations, or evaluate spatially proximate decision-objects.

completely unrelated tasks. The two independent variables for both experiments are *construal mindset* (abstract vs. concrete) – manipulated in Task 1 - and *focus of the probability assessment question* (hereafter: *focus*) (event vs. complement) – manipulated in Task 2. The dependent variable, which is captured in Task 2, is participants' *probability assessment* concerning the ability of an audit client to collect a customer's accounts receivable balance. Experiment 1, which represents the primary analysis, uses 90 experienced auditors. Construal mindset is manipulated in Task 1 by asking auditors to complete a task that requires either a high-level, abstract perspective or a low-level, concrete perspective. Either task is related to client "Wittim" and has no relationship to the subsequent task (Task 2) of assessing the probability that client "Premier Electro Tech" will be able to collect a customer's outstanding accounts receivable balance in full. The second experiment, which uses 118 undergraduate accounting students, is designed to provide further evidence that construal mindset rather than the nature of the experimental audit task drives participants' probability assessment. The purpose of Experiment 2 is to broaden the generalizability of the findings from Experiment 1 and to provide preliminary evidence that *other* audit tasks may also prompt the adoption of an abstract mindset orientation and similarly affect auditors' subsequent judgment. In Experiment 2, a construal mindset priming task developed in the psychology literature is administered prior to asking participants to render their probability assessment with respect to client Premier Electro Tech.

As predicted, the results from Experiment 1 show that auditors who adopt an abstract mindset orientation, compared to those who adopt a concrete mindset orientation, provide lower probability assessments. However, no support is found for the hypothesized interaction. In contrast, results from the second experiment show that student participants who adopt an abstract mindset orientation, compared to those who adopt a concrete mindset orientation, do not provide

lower probability assessments. However, the hypothesized interaction effect is significant. Additional analyses suggest that the probability-related predictions derived from CLT may be limited to situations in which the judgment of concern is relatively familiar to the decision-maker in terms of decision-domain and how the judgment question is posed.

Through an emphasis on task-induced mindset, this research has important implications for audit practice as the study illustrates that task sequencing can affect judgment in the absence of *any* meaningful relationship between the earlier task and the latter one. This finding is of interest to auditors who work in environments that require frequent shifts in focus due to multiple client or project demands. Awareness of the fact that evaluations of an event's likelihood of occurrence may be affected by the degree of abstract thinking required for a preceding task may help auditors avoid making overly optimistic (or pessimistic) probability assessments.

This study also contributes to the accounting literature since the focus on decision-makers' mindset suggests the possibility for future research to explore further task-induced mindset implications, which may affect auditors as well as other accounting professionals. As noted by Trope et al. (2007), mental construals not only guide evaluations, but also predictions, and actions. Initial insights into the consequences of task abstractness on subsequent judgments, as provided by this research, are therefore important for further investigations into post-evaluative behavior.

Finally, this study contributes to the psychology literature by corroborating a relatively under-researched implication of CLT, that is, the impact of construal mindset on probability assessment. To this author's knowledge, prior CLT research has not examined how construal mindset affects professional decision-makers' subsequent probability assessment in situations

that require skilled judgment within a work environment characterized by strong organizational guidelines and professional constraints. The importance of testing the predictive power of psychology theories in accounting settings is evident from Trotman and Wright's (2000) review of audit research on order and recency effects. Based on the mixed results from a large body of audit research, the authors conclude that the Hogarth and Einhorn (1992) model requires adaptation to the unique nature of audit tasks before additional research in this area is warranted. The unique or more relevant characteristics of audit tasks, which may similarly impact predictions derived from CLT, "include asymmetric loss functions, levels of accountability, need for justification, professional training and experience, and time constraints" (Trotman and Wright 2000, pgs. 179-180).

The remainder of this chapter is organized as follows: The next section reviews accounting literature on task sequencing. The third section provides theoretical foundations and develops the hypotheses. Section four describes the overall methodological approach. Sections five and six discuss Experiment 1 and 2 along with results, respectively. Section seven reports the results from additional analyses and Section eight discusses supplemental and exploratory measures. The last section draws conclusions, addresses some limitations, and offers directions for future research.

### Background

A recent practitioner-oriented literature review by Bhattacharjee et al. (2013) refers to the authors' earlier finding (see Bhattacharjee et al. 2007) that auditors address issues pertaining to a single audit client in only 25 percent of their work sessions. Noting that the majority of uninterrupted work periods (75 percent) are characterized by work on two or more clients, the

authors argue that the complex multi-client, multitasking audit environment may have profound impact on audit professionals' decision-making. The associated concern with potentially dysfunctional outcomes (with respect to audit effectiveness and efficiency) and task and client sequencing is highlighted by a relatively recent, yet limited stream of research by judgment and decision-making scholars (e.g., Lindberg and Maletta 2003; O'Donnell and Schultz, Jr. 2005; Bhattacharjee et al. 2007).

This research has identified undesirable carryover effects as a common form of information processing and recall-related errors. Carryover effects occur when auditors subconsciously allow information obtained from work on a prior task or audit client to influence their judgment on a current task or audit client (Bhattacharjee et al. 2013). With a focus on performing *multiple tasks* for a *single client* O'Donnell and Schultz, Jr. (2005) illustrate how strategic risk assessment affects auditors' sensitivity toward account-level fluctuations that are inconsistent with their holistic evaluation of their client's business model. The researchers hypothesize and find that auditors who perform strategic risk assessment, compared to those who do not perform such analysis, display greater tolerance for inconsistent account-level fluctuations in their assessment of account-level risk. Furthermore, when the developed (or endowed) strategic risk assessment indicates low risk, sensitivity to inconsistent account-level fluctuations is lower than when the strategic risk assessment indicates high risk. O'Donnell and Schultz, Jr. (2005) explain their findings in terms of halo theory and rule out alternative explanations such as auditors' attention, effort, or expectations.

Complementing O'Donnell and Schultz, Jr.'s (2005) investigation of judgment effects resulting from the performance of *multiple tasks* for a *single client* is research which focuses on judgment effects stemming from the performance of *similar tasks* for *multiple clients*. For

example Lindberg and Maletta (2003) and Grossman and Welker (2011) document how auditors may commit memory conjunction errors when multi-tasking involves more than one audit client. According to Lindberg and Maletta (2003), memory conjunction errors transpire when memory bits related to one situation are improperly associated with another situation during the memory reconstruction process. In the assurance context, auditors may associate audit evidence obtained from one client to another audit client, thereby negatively affecting audit effectiveness or efficiency, depending on the valence of the evidence. Lindberg and Maletta's (2003) experiment shows that the likelihood of committing memory conjunction errors is a complex function of the relationship between the memory trace and its origin, its target for memory reconstruction purposes, and audit risk. More specifically, the authors show that the combination of high audit risk, consistency of the audit evidence with the target client, and simultaneous inconsistency between the audit evidence and the client to which it actually pertains, leads to the highest likelihood that auditors falsely recognize the evidence as belonging to the target client. Grossman and Welker (2011) extend this research by showing that auditors' propensity to commit memory conjunction errors is higher when audit evidence is arranged in a causal sequence rather than in a traditional working paper order or in a random order. The authors reason that potentially shallower encoding of specific pieces of evidence and weaker cognitive association among evidence items and their respective source may result from causal ordering. Consequently, auditors may garner a sense of familiarity from the causal association between a client's storyline and the audit evidence of concern which may lead to attribution of the evidence to the wrong client. However, Bhattacharjee et al. (2007) show that even when memory bits are attributed to the proper client, judgment errors may occur as a result of contrast effects. Specifically, the researchers show that auditors, upon exposure to comparable judgment information, base their



assessment of a current client's information on a comparison of the former with similar information related to a prior client. This finding is consistent with psychology research that, according to the authors, has shown that in situations involving sequential judgments within a specific domain, antecedent judgment tasks establish a prime against which information pertaining to the subsequent judgment task may be compared. More importantly, Bhattacharjee et al. (2007) illustrate that this contrast effect cascades and affects indirectly associated, succeeding decisions for which comparable information is unavailable. Both, the initial contrast effect as well as its cascading effect are shown to systematically influence auditors' documentation of target client evidence.

Together, those studies provide converging evidence that working on multiple tasks and multiple clients within a short period of time affects auditors' judgments. However, the implications of such work environments on auditor's judgments in situations in which sequential tasks are neither related to the same client (as in O'Donnell and Schultz, Jr. 2005) nor related in terms of domain-specific information (as in Lindberg and Maletta's 2003 and Bhattacharjee et al. 2007) has largely been ignored. I argue that the investigation of such situations, which are arguably more commonplace,<sup>8</sup> calls for attention to the cognitive effects of performing an earlier task on the decision-maker's overall mindset. The reason for this is that in such situations decisions about a subsequent task cannot possibly be affected by additional information cues from either the same entity (whether relevant or irrelevant) or analogous information from

---

<sup>8</sup> Anecdotal evidence suggests that auditors – particularly higher rank auditors who review the work of their subordinates – direct their attention to a variety of clients and diverse client issues throughout the day (see also Bhattacharjee et al. 2013). For example, an audit senior may be 'wrapping-up' a particular engagement (e.g., resolving unexpected issues; conducting final analytical procedures; addressing high-level partner comments etc.) while also providing on-site supervision of staff auditors' working on a different client. Likewise, a manager may be at the site of client A, reviewing working papers related to client B, and answer occasional questions from staff conducting fieldwork at client A. Nevertheless, whether such scenarios are more likely than scenarios in which task-switching involves the same client or similar tasks remains an empirical question.

another entity which may or may not be justifiably relied upon to inform the latter decision. This research thus examines the deeper psychological effects which underlie auditor judgment and decision-making and argues that those psychological effects have broader explanatory power given that the likelihood of facing completely unrelated judgment tasks upon transitioning from one client to another seems far greater than the likelihood of facing highly similar tasks.

### Theory and Hypotheses

This study draws on construal level theory of psychological distance (CLT; Liberman and Trope 1998; Trope and Liberman 2003) in order to examine how the performance of common auditing tasks that require varying degrees of abstract thinking affects decision-makers' overall mindset and hence their subsequent judgments. CLT emphasizes the critical role of mental construal (i.e., mental representation) for individual judgment and decision-making and introduces the level of abstraction as a distinctive attribute of various mental construals (Fujita and Han 2009) that, in turn, influence evaluation, prediction, and behavior (Trope et al. 2007).

The core premise of CLT is that psychological distance is tied to the level of mental construal (Bar-Anan et al. 2006; Trope and Liberman 2010), such that more distant objects, that is, objects that are psychologically farther removed from the *here* and *now*, are construed at a higher level (Trope and Liberman 2010). While high-level construals of an object, event or situation are rather abstract and emphasize superordinate, decontextualized, and global aspects, low-level construals contain more concrete, contextualized, and subordinate features (Liberman and Trope 1998). Moreover, the relationship between psychological distance and mental construal is bidirectional such that higher-level (i.e., more abstract) construals evoke thoughts of more distant objects (Trope and Liberman 2010). According to Trope and Liberman (2010, p.

442), “Psychological distance refers to the perception of *when* an event occurs, *where* it occurs, to *whom* it occurs, and *whether* it occurs”. In other words, the psychological distance dimensions proposed by CLT include social distance (e.g., in-group vs. out-group, oneself vs. others, and active social role vs. inactive social role), spatial distance, and hypotheticality (Trope and Liberman 2010). The underlying reason for the association between psychological distance and construal level is assumed to stem from differential knowledge about near and distant events: the farther an event is removed from direct experience, the less dependable information is usually available, leading to the construction of more schematic (abstract) mental representations. CLT research shows that this association is overgeneralized such that it affects construal level even in the presence of equivalent information about near and distant situations (Trope and Liberman 2003; Trope et al. 2007; Liberman et al. 2007).

Several recent CLT studies focus more or less exclusively on the probability dimension of psychological distance which is of particular interest to this research. Wakslak et al. (2006), for example, argue for an inverse relationship between probability and level of construal since an event that could have occurred or one that is merely possible is farther removed from one’s direct experience (i.e., the *here* and *now*) than an event that actually occurred or one that is certain to occur. Hence, unlikely events should cause individuals to focus on the events’ abstract, superordinate, global aspects (high-level construal) while more likely events should draw attention to detail-level, specific, subordinate aspects (low-level construal). Moreover, this relationship is expected to persist even under circumstances in which individuals have identical knowledge about low-probability and high-probability events (Wakslak et al. 2006). Wakslak et al. (2006) confirm the predicted relationship through seven studies in which they directly measure the effects of probability on the construal of various events. In the first six studies in

Wakslak et al. (2006) participants were either prompted to think about an event as probable (low-level condition) or as improbable (high-level condition) while the seventh study uses a semantic priming task (i.e., low- or high probability sentences) to initiate a concrete (low-level condition) or abstract (high-level condition) processing orientation. Experimental results indicate that participants in low-probability conditions (compared to those in high-probability conditions) categorize objects into broader, more inclusive segments; demonstrate a greater preference for generic rather than detailed activity descriptions; decompose action into fewer segments; are more effective in detecting structure contained in visual information; are less effective in detecting details omitted from a coherent picture; and prefer to categorize behaviors in terms of their ends rather than their means (in an action identification task) (Wakslak et al. 2006). Taken together, Wakslak et al.'s (2006) results provide strong evidence for the hypothesized inverse relationship between probability and construal level and illustrate how a focus on either low- or high probability events affects individuals' behavior and preferences.

Todorov et al. (2007) further explore the CLT proposition that probability affects preferences through its impact on the level of construal. The authors propose that desirability concerns should be more prominent than feasibility concerns when the probability of an outcome is low (i.e., in high psychological distance conditions). However, as the outcome probability rises (that is, psychological distance decreases), feasibility concerns may become even more prominent (but not less) than desirability concerns. Todorov et al.'s (2007) experimental results confirm the predicted patterns and show that in low probability situations subjects favored outcomes which they considered highly desirable albeit difficult to obtain to outcomes deemed less desirable but easily achievable. In high probability scenarios, subjects either expressed reverse preferences or indifference. Additionally, Todorov et al. (2007) find that the weight

attributed to the means-related aspects of a decision are more sensitive to variations in probability than the weight attributed to ends-related aspects. It is important to note that those findings contradict normative behavior which suggests that preferences should not be influenced by the likelihood of an outcome.

Most relevant to the present investigation is a study by Wakslak and Trope (2009) who propose that individuals use their general cognitive orientation (that is, the degree of abstraction in their thinking) as a signal to inform probability judgments. Hence, the authors investigate the impact of construal level (i.e., cognitive mindset orientation) on probability rather than the reverse direction of causality which was the focus of earlier studies (see Wakslak et al. 2006; Todorov et al. 2007). Given that the uncertainty surrounding specific attributes of improbable events may cause individuals to generally construe unlikely events at a higher level (i.e., in more abstract terms), the authors hypothesize that prompting an abstract mindset will lead individuals to focus on the unlikelihood of a given event, thereby decreasing their assessment of the event's probability. In short, an abstract mindset orientation should promote perceptions of improbability whereas a concrete mindset orientation should impart a sense of likelihood. This argumentation is in line with Liberman and Trope's (2008) literature review in which they argue "...activating high-level construals should lead people to think of events in psychologically more distant situations" (p. 1204). Moreover, Wakslak and Trope (2009) suggest that this relationship is predicted to hold regardless of how the general mindset orientation is initially activated (e.g., by manipulation via an unrelated task). Results from five studies support their propositions (Wakslak and Trope 2009).

A major contribution of Wakslak and Trope (2009) is that they illustrate how a myriad of diverse manipulations, even when entirely unrelated to the situation being evaluated, may affect

the assessment of probability. The construal level manipulations used by the authors include a task where participants compare products with either alignable attributes (concrete condition) or nonalignable attributes (abstract condition); a categorization task which prompts participants to either identify a superordinate category (abstract condition) or a subordinate example (concrete condition) for each emphasized word on the experimental instrument; a priming task which prompts participants in the abstract [concrete] condition to link a described activity "...to increasingly abstract goals by answering a series of 'why?' questions" ["...to increasingly concrete activities by answering a series of 'how?' questions"] (p. 55); Navon's (1977) task in which participants are asked to either identify the large letters (abstract condition) or small letters (concrete condition) of "...a series of large letters, each of which was composed of repetitions of a given small letter" (p. 56); and a hierarchical shape task which requires participants to circle either each large shape (abstract condition) or each small shape (concrete condition) in "...a series of large shapes made up of smaller shapes" (p. 56). Given that this variety in mindset manipulations led to consistent support of Wakslak and Trope's (2009) hypothesis suggests that other tasks which may occur more naturally in a work environment could similarly affect overall mindset orientation and hence affect subsequent probability assessments. Moreover, probability assessments unrelated to the mindset-influencing preceding task may be affected as Wakslak and Trope's (2009) results show that construal mindset serves as a cue to inform prospect assessment even in situations in which such cue stems from a stimulus external to the evaluation task.

In sum, as discussed above, the literature suggests that probability is a dimension of psychological distance and as such is tied to the level of mental construal (Trope and Liberman 2003, 2010; Wakslak et al. 2006; Todorov et al. 2007; Wakslak and Trope 2009). Based on CLT, objects or events that are psychologically farther removed from direct experience (the *here* and

*now*) are construed in more abstract terms due to the fact that less dependable information is usually available for such objects or events (Trope and Liberman 2003; Trope et al. 2007; Liberman et al. 2007). This relationship is bidirectional such that abstract construal (that is, an abstract mindset orientation), will bring to mind psychologically more distant objects (Wakslak et al. 2006; Wakslak and Trope 2009; Trope and Liberman 2010). Accordingly, as individuals generally construe improbable events more abstractly due to the uncertainty surrounding specific attributes of such events, prompting an abstract mindset should lead individuals to focus on the unlikelihood of a given event, thereby lowering their assessment of the event's probability (Wakslak and Trope 2009). This inverse relationship between probability and construal mindset orientation (Wakslak et al. 2006; Wakslak and Trope 2009) should hold irrespective of whether the general mindset orientation is activated through a related or unrelated task (Wakslak and Trope 2009). Consequently, H1 predicts that auditors who have adopted an abstract mindset orientation as a result of performing an audit task that requires abstract thinking will assess the probability associated with an unrelated, subsequent judgment task to be lower than auditors who initially performed a task requiring concrete thinking. Formally stated:

*H1: Construal mindset orientation affects auditors' professional judgment such that auditors who have adopted an abstract mindset (as a result of a preceding audit task), compared to those who have adopted a concrete mindset (as a result of a preceding audit task), provide lower probability assessments for an event.*

Figure 2 illustrates the effect predicted by H1.

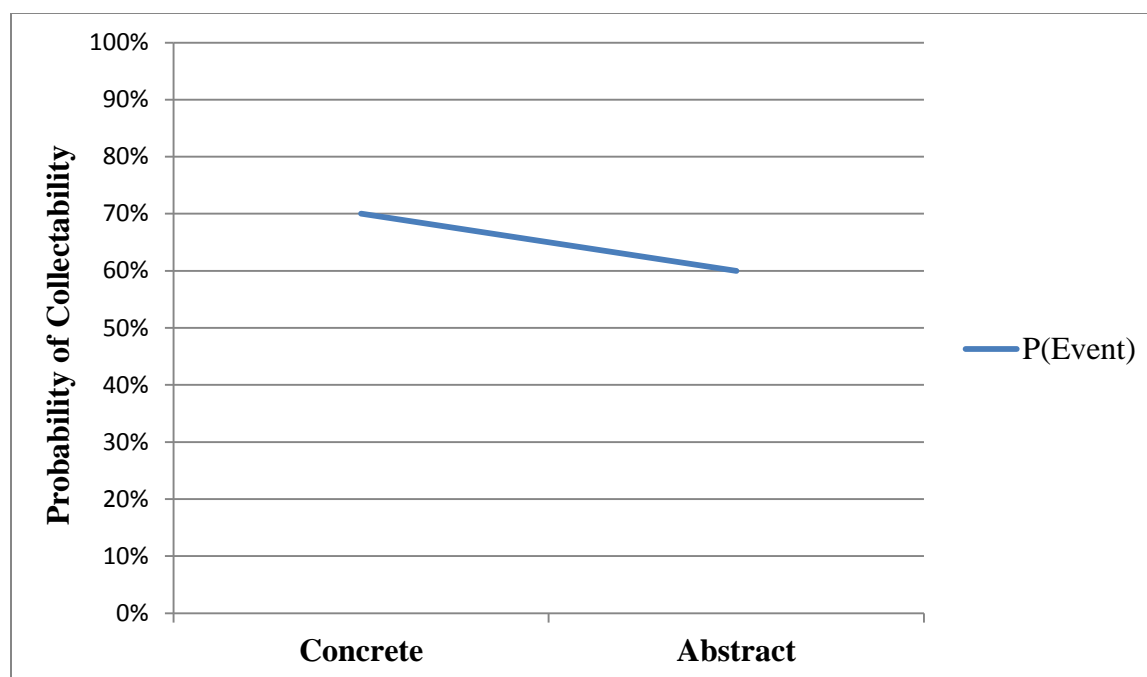


Figure 2: Expected Results - H1

Notably, the impact of construal mindset on probability assessment predicted by CLT and articulated as a main effect in H1 does not discriminate with respect to the focus of the probability assessment task. To meet the mandates of extensional logic, a comparatively low probability assessment for the occurrence of an event (as a result of the adoption of an abstract mindset orientation) should be complemented with a comparatively high probability assessment for the non-occurrence of the same event so that the combined probabilities sum to 1. Conversely, a comparatively high probability assessment for the occurrence of an event (as a result of the adoption of a concrete mindset orientation) should be complemented with a comparatively low probability assessment for the non-occurrence of the same event so that the combined probabilities sum to 1. If, however, both of those requirements are met, the prediction articulated in H1 would not hold as the complementary probability associated with the abstract mindset condition would be larger than the complementary probability associated with the



concrete mindset condition. The prediction based on CLT therefore implies that a probability assessment bias would be introduced. Such a bias could be reflected in combined probabilities (i.e., assessed probabilities for both the occurrence and the non-occurrence of the event) for either or both construal mindset conditions. However, given that a concrete mindset is the default mindset (Malkoc et al. 2010) combined probabilities of less than 1 are expected in the abstract mindset condition and close to 1 in the concrete mindset condition. This, in turn, would point to a probability assessment bias introduced by the abstract mindset orientation condition. As noted by Wakslak and Trope (2009) with respect to non-sequential evaluations, abstraction should not only lower one's likelihood assessment for an event (e.g., probability of A occurring) but also that for its complement (probability of A not occurring), depending on the focus of the judgment task.

This line of argumentation is best illustrated through an example. Assume auditors who have adopted a concrete mindset assess the probability of an event's occurrence at .7 while those who have adopted an abstract mindset assess the probability of the same event's occurrence at .6 (i.e., lower, as predicted by CLT). Based on those initial assessments, the complementary probabilities would be .3 and .4, respectively. However, CLT suggests that auditors who have adopted an abstract mindset will also assess the probability associated with the event's non-occurrence lower than auditors who have adopted a concrete mindset. Accordingly, auditors who have adopted an abstract mindset may assess a .25 probability (rather than a .4 probability) for the event's non-occurrence which is lower than the .3 probability assessment rendered by auditors who have adopted a concrete mindset. However, a .25 probability assessment for the event's non-occurrence would suggest a .75 complementary probability (i.e., the event's occurrence) which is higher than the initial assessment of .6. Figure 3 illustrates the expected

pattern in probability assessments based on the above assumed probabilities. The hyphenated line  $1-P[\text{Complement}]$  depicts the complimentary probability assuming that auditors in the abstract mindset orientation will assess the probability of the event's non-occurrence to be .25 rather than the normative probability of .4 based on a .6 probability assessment for the event's occurrence. In other words, absent any bias, line  $1-P[\text{Complement}]$  which represents the same assessment as line  $P[\text{Event}]$ , should be superimposed on the latter line (i.e., the lines should not diverge). Line  $1-P[\text{Complement}]$  thus represents the *implied* probability assessment for the event.

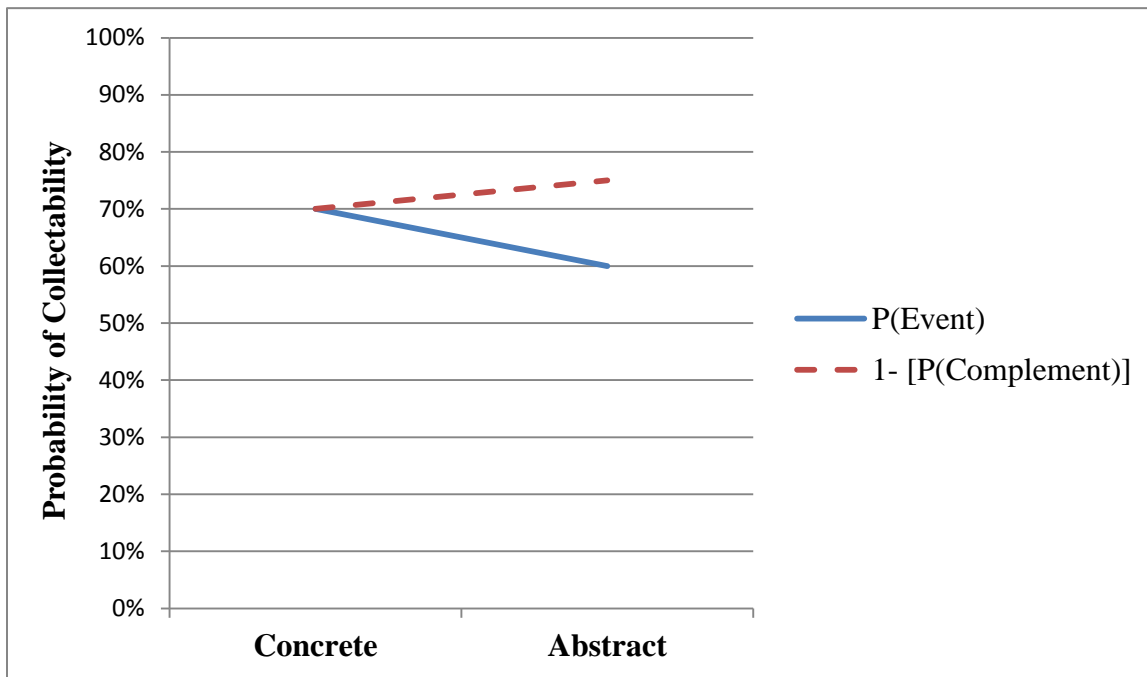


Figure 3: Expected Results - H2

Given the basic CLT proposition that abstract construal lowers perceived probability regardless of the focus of the probability assessment task, H2 predicts that auditors who have adopted an abstract mindset orientation will render combined probability assessments that will diverge from 1 to a greater extent than those of auditors who have adopted (or maintained) a concrete mindset orientation. Formally stated:

*H2: Combined probability assessments for the occurrence and the non-occurrence of an event will be closer to 1 for auditors who have adopted a concrete mindset orientation (as a result of a preceding audit task) than for auditors who have adopted an abstract mindset orientation (as a result of a preceding audit task).*

## Research Method

### Overview

To test the hypotheses, two experiments each following a 2 x 2 between-subjects factorial design, were conducted. The design of each experiment fully crosses construal mindset orientation (MINDSET) and focus of the probability assessment question (FOCUS) between participants. Both experiments incorporate two unrelated decision-tasks: Task 1 and Task 2. Upon completing Task 2, participants in both experiments responded to various debriefing, manipulation check, and biographic questions before submitting their responses (see respective subsections). Experiment 1, which uses an audit task as Task 1 and experienced auditors as participants, represents the primary analysis. Experiment 2, which uses a well-established psychology-based priming task as Task 1 and undergraduate accounting students as participants, serves as a robustness test for the results derived from the first experiment. Moreover, Experiment 2 is designed to shed light on the underlying psychological processes activated in the auditor participants. Qualtrics was used to randomize the assignment of participants to the experimental conditions and to obtain approximately equal cell sizes. Appendices A and B illustrate the experimental material for Experiment 1 and Experiment 2, respectively. Participants in Experiment 1 took an average of 14.2 minutes (s.d. = 9.75) (no difference across conditions; p

= 0.489) to complete the experiment,<sup>9</sup> while participants in Experiment 2 took an average of 15.4 minutes (s.d. = 12.01) (no difference across conditions;  $p = 0.306$ ) to complete the experiment.

### Independent and Dependent Variables

The two independent variables for both experiments are MINDSET (abstract vs. concrete) and FOCUS (event vs. complement). MINDSET is manipulated in Task 1 and FOCUS is manipulated in Task 2. Task 1 differs between Experiment 1 and Experiment 2 and is explained in the respective subsections (see sections “Experiment 1” and “Experiment 2” and related Figures 4 and 7).

In the context of the experimental material, ‘event’ refers to the *collectability* of a customer’s outstanding accounts receivable balance whereas ‘the event’s complement’ refers to the *uncollectibility* of a customer’s outstanding accounts receivable balance. Participants in the event condition responded to the question “Based on the above information, what is your estimate of the probability that the receivable will be **collectible** next year?” Participants in the complement condition responded to the question “Based on the above information, what is your estimate of the probability that the receivable will be **uncollectible** next year?” Thus, the primary dependent variable in both experiments is the participants’ *probability assessment* pertaining to a hypothetical client’s ability to collect a customer’s outstanding accounts receivable balance. Participants responded on a sliding scale with a minimum of 0% and a maximum of 100%. Percentages selected were displayed and recorded at each 1% increment. The case material for

---

<sup>9</sup> For purposes of calculating the average time, four participants who took more than 51 minutes (2 standard deviations from the mean) were eliminated. Given that two of those participants took approximately 24 and 48 hours, respectively it was assumed that either the Qualtrics timer failed or that those participants accessed the link and did not start taking the survey until a later time.

Task 2, which is identical for both experiments and described in more detail in the discussion of Experiment 1, is adapted from Joyce and Biddle (1981 – Experiment 3a).

## Experiment 1

### Participants

Participation for Experiment 1 was solicited from personal contacts at audit firms as well as from a survey company.<sup>10</sup> All participants accessed the Qualtrics-based experimental material online and only those who indicated in the screening questions that they had “at least 2 years’ of audit experience” and that they are “currently working in public accounting” were permitted to proceed.<sup>11</sup> The survey software randomly assigned participants to the four experimental conditions. To ensure that only auditors who paid sufficient attention to the experimental material were recruited through the survey company, participants who either failed the manipulation check question (discussed below) or an attention question (see Appendix A), were exited from the survey.

A total of 90 auditors, 66 from personal contacts and 24 from the survey company, completed the experimental material. Participants’ mean age was 35.4 years and mean years of audit experience was 9.3 years. The sample consists of 60 male (66.7%) and 30 female (33.3%) auditors. Sixty auditors (66.7%) indicated that they work for a national, international, or Big 4 audit firm, while the remaining 30 auditors (33.3%) indicated that they work for a local or regional firm. The sample consists of 23 staff auditors (25.6%), 28 senior auditors (31.1%), 22

---

<sup>10</sup> Participants recruited from the survey company were compensated for their participation. The amount of compensation is unknown to the researcher.

<sup>11</sup> Participants recruited from personal contacts were not asked to answer the screening questions since only those who met the required criteria were contacted.

managers (24.4%), 9 directors (10.0%), and 8 partners (8.9%). With respect to education, 36 participants (40.0%) declared a Bachelor's degree as the highest level of education attained, 45 auditors (50.0%) a Master's degree, and 9 auditors (10.0%) a doctoral degree. Well over half of the participants (67.8%) indicated that they hold a CPA license. No significant differences with respect to any of the demographic measures (age, years of audit experience, gender, position, education, and professional licenses) exist across experimental conditions (all p-values > 0.25).

Table 8 presents the demographic information.

Table 8: Demographics - Experiment 1

---

		<b>(N = 90)</b>	
<b>Age</b>			
Mean		35.4	
Median		34.5	
Minimum		23.0	
Maximum		68.0	
Standard Deviation		9.4	
<b>Years of audit experience</b>			
Mean		9.3	
Median		7.0	
Minimum <sup>a</sup>		1.0	
Maximum		45.0	
Standard Deviation		7.9	
		<b><u>Number</u></b>	<b><u>Percent<sup>b</sup></u></b>
<b>Gender</b>			
Male		60	66.7%
Female		30	33.3%
<b>Firm Size</b>			
Big 4		13	14.4%
International		29	32.2%
National		18	20.0%
Regional		17	18.9%
Local		13	14.4%

---

---

	<u>Number</u>	<u>Percent<sup>b</sup></u>
<b>Position</b>		
Staff	23	25.6%
Senior	28	31.1%
Manager	22	24.4%
Director	9	10.0%
Partner	8	8.9%
<b>Highest academic degree</b>		
Bachelor's	36	40.0%
Master's	45	50.0%
Doctoral	9	10.0%
<b>Professional licenses<sup>c</sup></b>		
CPA	61	67.8%
CA	10	11.1%
Other	31	34.4%

---

<sup>a</sup> Two participants indicated only 1 year of audit experience even though the qualification criteria specified a minimum of two years' audit experience. Eliminating those participants from the analyses does not alter the overall reported results.

<sup>b</sup> Percentages are rounded and do not always add up to 100%

<sup>c</sup> Several participants indicated that they hold more than one professional license. Totals do therefore not add up to N=90 and 100%, respectively.

### Experimental Procedures

Experiment 1 manipulates construal mindset by asking auditors to conduct a plausible audit task which requires either a high-level, abstract perspective or a low-level, concrete perspective. Each task is related to fraud risk assessment. Recent literature on fraud risk assessment (see Wilks and Zimbelman 2004b and Favere-Marchesi 2013) finds beneficial effects from decomposing fraud-risk assessments (i.e., individually assessing the risk stemming from management attitudes, opportunities, and incentives prior to rendering a judgment about the overall fraud risk) and suggests the possibility that auditors who decompose their assessments first engage in *categorization* in order to reduce cognitive load (Favere-Marchesi 2013).

While present PCAOB standards do not require auditors to categorize fraud-risk into one of three categories identified by AU Section 316 (SAS 99) (PCAOB 2002) (i.e., Incentives/Pressures, Opportunities, Attitudes/Rationalizations)<sup>12</sup>, Favere-Marchesi (2013), argues “categorization is a reasonable first step in auditors’ fraud-risk assessments” (p. 203). With references to psychology research, he further explains that the inclination to categorize is a ubiquitous facet of human thought and a natural response to decision-makers’ limited information-processing capacity as categorization is critical for problem-solving and reasoning.

CLT research adds to this literature by pointing out that the association between psychological distance and construal level has critical implications for categorization (Lieberman and Trope 2008). A firmly established finding within the CLT literature is that broad categorization is associated with abstract construal (e.g., Liberman et al. 2002; Fujita et al. 2006a; Smith and Trope 2006; Wakslak and Trope 2009). Given that Wakslak and Trope (2009) suggest that tasks requiring the grouping of objects into broad categories prompt an abstract mindset and that, within the accounting literature, Wilks and Zimbelman (2004a) note that “categorization may help auditors think more broadly” (p. 177), a categorization task involving three broad categories to induce an abstract mindset orientation was used.

The abstract mindset condition of Task 1 requires participants to categorize a randomly ordered listing of 30 statements pertaining to a hypothetical audit client (“Wittim”) into three broad fraud risk factor categories (incentives/pressures, opportunities, and attitudes/rationalizations). Specifically, participants were asked to “consider carefully the implications of each statement and assign each statement to one of the above listed categories.”

---

<sup>12</sup> While AU Section 316 (SAS 99) “suggests a consideration of fraud-risk factors classified in those three components” (Favere-Marchesi 2013, p. 203), only an *overall* fraud-risk assessment rather than an assessment for each component is required.



Each statement is modeled after one of the fraud risk factors identified by AU Section 316. Participants read a brief client description adopted from Morrill et al. (2012) (introductory paragraph only), and were informed that a member of their audit team compiled the 30 statements about Wittim. Twenty-one of those statements indicate the presence of a risk while the remaining 9 statements (three within each fraud risk category) do not suggest heightened risk. The latter are constructed by negating the wording of various AU Section 316 statements and serve a twofold purpose: first, their inclusion renders the task slightly more difficult which may prompt auditors to devote more thought to the task; second, their inclusion should lead to a more balanced assessment of fraud risk factors related to the client (rather than an assessment that may be considered excessively negative). The case material was designed to contain information similar to that which would be used by experienced auditors in rendering a fraud risk assessment during the planning phase of the audit. The fraud risk category definitions included in the experimental material are adopted from Wilks and Zimbelman (2004b).

Participants in the concrete mindset orientation condition received identical background information, fraud risk category definitions, and statements about Wittim. In contrast to the abstract mindset orientation condition, however, the same 30 statements were already grouped according to the three fraud risk factor categories. Rather than categorizing the statements, participants were instructed to “consider carefully *how* the information contained in each statement affects [their] assessment of risk related to the respective risk category.” Differently stated, participants were asked to evaluate the significance of the fraud risk factors. Participants responded to category-specific questions about how they perceive each statement to affect the risk of misstatements arising from fraudulent financial reporting. Answers were captured on a 5-point Likert scale anchored at 1 (“substantially decreases”) and 5 (“substantially increases”). The

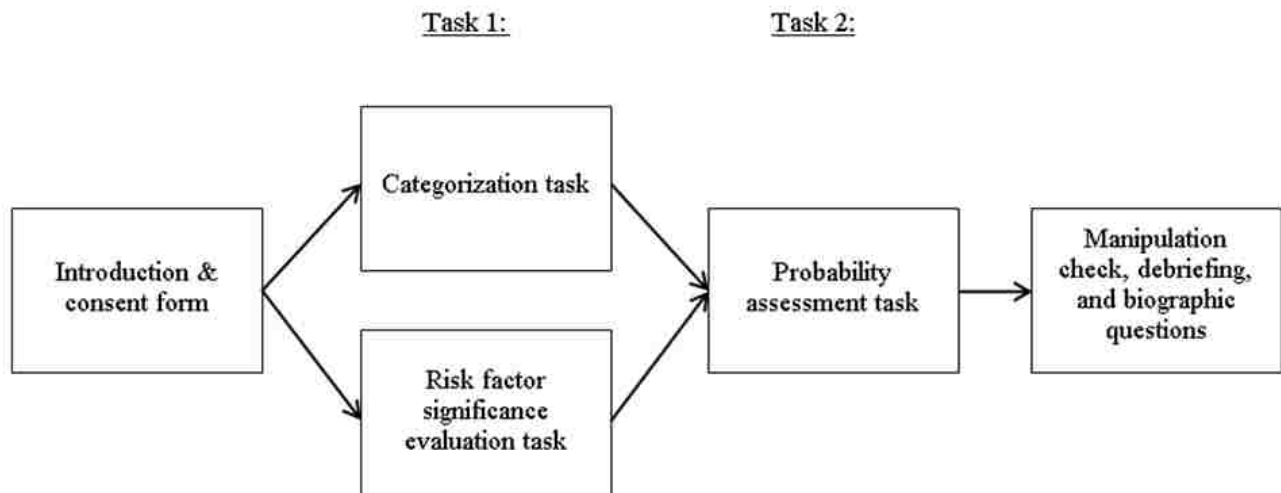
reason for capturing responses on a 5-point Likert scale rather than merely asking whether each statement indicates heightened risk or not is that the former method was considered more suitable for prompting participants to devote more thought to each statement (as would likely be required in an actual audit).

Given that Malkoc et al. (2010) argue that a concrete mindset is the default mindset and that participants will not be prompted to think in terms of higher-level categories (that is, to group risk factors), the argument in this study is similarly that this task will sustain or promote a concrete mindset orientation. Furthermore, the experimental material asked participants to consider the implications of each statement in the form of *how*-questions. While those *how*-questions do not strictly prompt the consideration of a *process* (as in Wakslak and Trope 2009), they are somewhat similar in that they require sequential reasoning. That is, participants needed to evaluate each statement with respect to its impact (if any) on the risk of misstatement arising from fraudulent financial reporting attributable to the *specific* risk category.

Task 2, adapted from Joyce and Biddle (1981 – Experiment 3a) asked participants to estimate the probability that the accounts receivable balance owed to an audit client (“Premier Electro Tech”) by a single customer will be collectible or uncollectible. Participants are informed that their review of an audit client’s allowance for uncollectible receivables reveals that a very large account - material to the audit – is 6 months past due from a single customer who has provided a positive confirmation that the balance is correct. Participants are further informed that, based on their past “experience with Premier Electro Tech [that] the company has been able to collect receivables that are 6 months past due about half of the time.” The case scenario continues explaining that the audit client’s controller believes that the entire amount will be recoverable. Additionally, the audit client’s credit manager clarifies that although the customer’s

“average payment time on accounts receivable has steadily increased” the delay in payment is attributable to an inadequate accounting system – which is currently being replaced – rather than to problems with generating cash flows. Participants were then asked either to estimate the probability that the accounts receivable balance owed to Premier Electro Tech will be collectible or that it would be uncollectible. Participants responded on a sliding scale with a minimum of 0% and a maximum of 100%.

Appendix A illustrates the experimental material for Experiment 1. Note that either condition of the mindset manipulation task required auditors to render 30 decisions in the domain of fraud risk assessment (Task 1; fraud risk assessment task). The 30 statements, which are based on fraud risk factors identified in AU Section 316 (SAS 99), and modified to describe a hypothetical audit client, are identical for either mindset manipulation condition. Aside from requiring an equal number of decisions, the conditions were expected to require a similar amount of effort. Perceived difficulty associated with Task 1 was captured in the debriefing questions (see below). Task 1 is related to client Wittim and has no relationship to the subsequent task of estimating the probability that the accounts receivable balance owed to client Premier Electro Tech will be collectible or uncollectible (Task 2; probability assessment task). After completing Task 2, participants who passed the manipulation check questions responded to debriefing questions and provided biographic information before submitting their results. Figure 4 depicts the experimental procedures. The experimental conditions are summarized in Table 9.



**Notes:**

This figure illustrates the experimental procedures for Experiment 1 wherein auditors in the abstract mindset orientation condition complete the categorization task (i.e., grouping risk factors into incentives/pressures, opportunities, and attitudes/rationalizations) and auditors in the concrete mindset orientation condition complete the risk factor significance evaluation task.

Figure 4: Experimental Procedures - Experiment 1

Table 9: Experimental Conditions - Experiment 1

---

<u>Condition</u>	<u>Mindset Orientation</u>	<u>Manipulation Method (Task 1)</u>	<u>Focus of Probability Assessment Task</u>
1	Abstract	Categorization of Risk Factors	Event
2	Abstract	Categorization of Risk Factors	Complement
3	Concrete	Risk Factor Significance Evaluation	Event
4	Concrete	Risk Factor Significance Evaluation	Complement

---

This table illustrates the four conditions of the experimental material and relates the mindset orientation manipulation to the respective version of Task 1. The focus of the probability assessment task is manipulated within Task 2.

### Manipulation Checks

Given the nature of the experimental tasks and the research question, it is critical that participants understand that their decisions associated with Task 1 and Task 2 relate to different audit clients. Accordingly, participants were asked to indicate whether the following statement is correct or false (true/false format): “The two preceding tasks (‘Fraud Risk Factor Task’ and ‘Accounts Receivable Task’) were related to the same audit client”. Only participants who were recruited from personal contacts were able to proceed after failing the manipulation check question. Responses from seven auditors who failed the manipulation check question were subsequently eliminated in order to ensure equal treatment of participant pools (see also discussion in section “Participants”).

### Debriefing Questions

A debriefing question inquired about the perceived difficulty of the fraud risk factor task. Responses were provided on a 5-point Likert scale anchored by 1 (“very easy”) and 5 (“very difficult”). Overall, auditors judged the fraud risk factor task to be neither easy nor difficult (mean = 2.80, s.d. = 0.90). Difficulty assessments did not differ across conditions ( $p = .924$ ) suggesting that the fraud risk factor categorization task (i.e., the abstract version of Task 1) was considered as difficult as the fraud risk factor significance evaluation task (i.e., the concrete version of Task 1). Participants were also asked to indicate whether they had experience with rendering a probability assessment similar to the one described in the experimental material. Answers were captured in yes/no format. The majority of auditors (68%) indicated such experience (no difference across conditions:  $p = .527$ ). Lastly, for exploratory purposes, a debriefing question was incorporated to capture auditors’ perception about whether completion

of the fraud risk factor task (client Wittim – Task 1) required “abstract thinking” or “concrete thinking”. Prior to answering this question, participants were introduced to the abstract versus concrete thinking concepts through a plain-English definition of those terms, followed by a categorization exercise involving ten potential audit tasks. In this exercise, auditors selected either “Abstract Thinking” or “Concrete Thinking” as the required type of cognition associated with completing the described tasks. Five of the described audit tasks require abstract thinking whereas the remaining five audit tasks call for concrete thinking.<sup>13</sup> Although auditors scored high on the classification task (mean: 7.8 out of 10 correctly classified; no difference between conditions:  $p = .314$ ) and thus seem to have internalized the difference between abstract thinking and concrete thinking, their ability to correctly categorize the fraud risk factor task varied by condition. While 77.3% of participants in the abstract mindset conditions correctly identified their version of Task 1 as requiring abstract thinking, only 19.6% of participants in the concrete mindset conditions correctly identified their version of Task 1 as requiring concrete thinking.

## Results

H1 predicts that construal mindset orientation affects auditors’ professional judgment such that auditors who have adopted an abstract mindset provide lower probability assessments for an event than auditors who have adopted a concrete mindset. To test H1, a *t*-test comparing the mean probabilities assessed by participants in the ‘concrete mindset / event’ condition with those of the ‘abstract mindset / event’ condition was conducted. Results shown in Table 10 reveal that, on average, auditors in the concrete mindset condition assessed the probability that the accounts receivable will be **collectible** moderately higher (mean = 68.84, s.d. = 12.53) than

---

<sup>13</sup> A pretest of the ten items with several Accounting Ph.D. students resulted in 100% identical categorizations – in line with the researcher’s expected classifications.

auditors in the abstract mindset condition (mean = 61.43, s.d. = 18.85). This difference is moderately significant ( $t_{33.73} = 1.539$ , one-tailed  $p = .067$ ) and represents a small- to medium-sized effect (Cohen's  $d = .47$ ;  $r = .26$ ) (Cohen 1988, 1992).<sup>14</sup> The downward sloping trend line shown in Figure 5 supports this prediction. H1 is therefore supported.

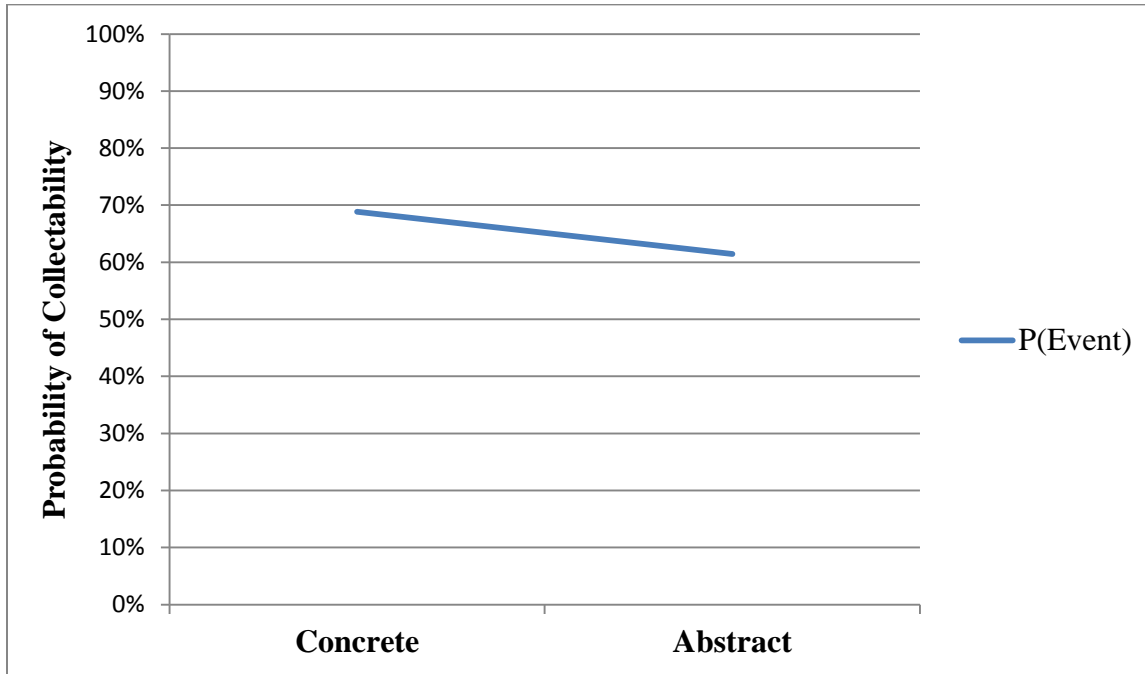


Figure 5: Estimated Means - Experiment 1: H1

Table 10: Results - Experiment 1: H1

T-Test Results								
Condition	N	Mean	S.D.	t	df	p-value <sup>a</sup>	Effect Size	
							d	r
Concrete / Event	25	68.84	12.53	1.539	33.73	.067 <sup>b</sup>	.47	.26
Abstract / Event	21	61.43	18.85					

<sup>a</sup> One-tailed significance level

<sup>b</sup> Since homogeneity of variance was violated (Levene statistic = .008) a Welch test was performed. Results are identical to those from the independent sample t-test ( $F = 2.368$ ; one-tailed  $p = .067$ ).

<sup>14</sup> The  $t$ -test was conducted with approximately half the sample size ( $n = 46$ ). Therefore, the effect size was not expected to be strong.

H2 predicts that the combined probability assessments for the occurrence and the non-occurrence of an event will be closer to 1 for auditors who have adopted a concrete mindset orientation than for auditors who have adopted an abstract mindset orientation. As such, H2 predicts an interaction between MINDSET and FOCUS.

Auditors' mean probability assessments are graphically depicted in Figure 6. Both lines in Figure 6 represent auditors' "event" assessment (i.e., the estimated probability that the accounts receivable balance will be *collectible*) even though the hyphenated line is derived (i.e., calculated as 1 minus probability of complement) and thus contingent on the assumption that participants in the complement condition would have provided perfectly complementary assessments had they been exposed to both the "event" and the "complement" version of the probability assessment question. Contrary to expectations, the hyphenated trend line slopes downward, does not meet the solid line in the concrete condition, and lies below the solid line. As such, the trend lines point toward a second, unexpected main effect associated with independent variable FOCUS. Differently stated, the lack of anticipated slope change suggests that the ordinal interaction predicted in H2 (compare to Figure 3) is not supported.



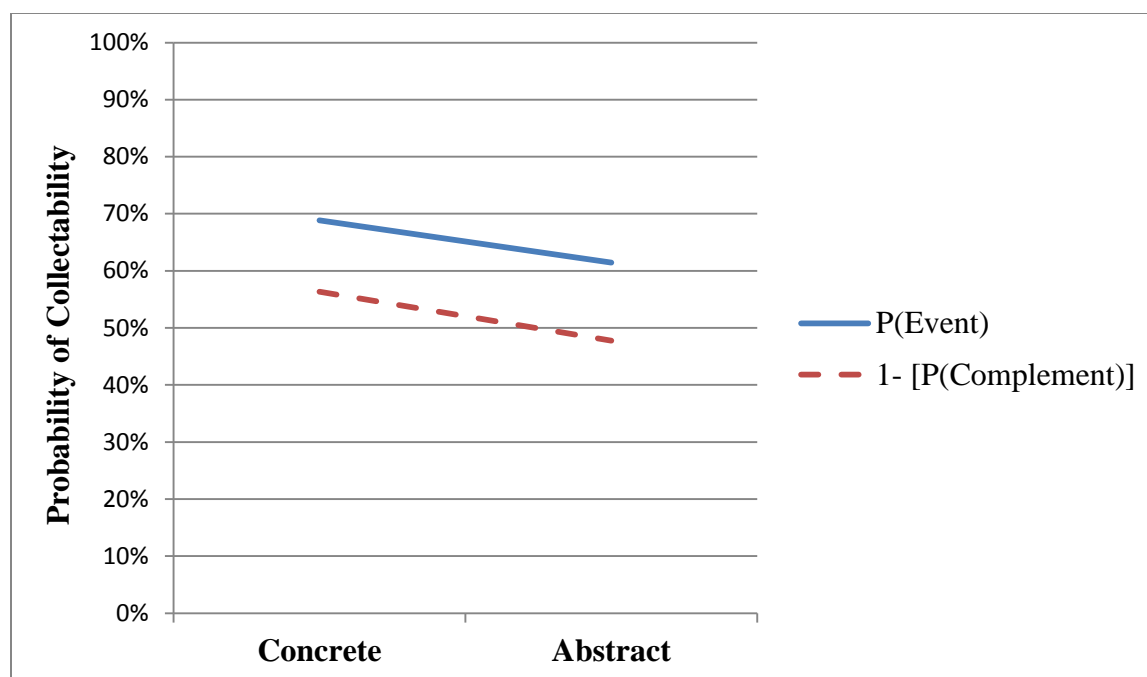


Figure 6: Estimated Means - Experiment 1: H2

To test H2, data from the complete sample ( $n = 90$ ) was used. Probability assessments provided by auditors in the complement conditions were transformed into implied event probability assessments (i.e., calculated as 1 minus probability of complement) such that all responses relate to the same dependent variable measure and thus permit ANOVA testing.

Prior to conducting hypothesis testing for H2 via traditional ANOVA, a linear regression (untabulated) was performed in order to identify potential covariates. All demographic variables (age, gender, audit experience, position in firm, firm size, education, and professional licenses) were simultaneously regressed on the dependent variable. As none of the demographic variables was significant, the ANOVA results reported below do not incorporate covariates.<sup>15</sup>

<sup>15</sup> ANOVA using the full sample size violates the assumption of equal error variances based on Levene's test ( $p = .018$ ) and Hartley's  $F_{\text{Max}}$  test (untabulated). To deal with this potential problem, the analysis was repeated with equal cell sizes (Glass 1972). A random number generator (<https://www.random.org/>) was used in order to select four observations in the 'concrete mindset / event' condition and two observations in the 'abstract mindset / complement' condition for elimination, resulting in equal cell sizes (21 observations per cell). Although ANOVA results with equalized cell sizes (untabulated) show lower p-values for both independent variables as well as for the interaction

Table 11 - Panel A displays the descriptive statistics for the participants' probability assessment concerning the *collectability* of accounts receivable under each of the four treatment conditions. Given that H2 predicts a significant interaction between MINDSET and FOCUS, the predicted mean probability for the event (i.e., 68.84%) should be close to (and theoretically equal to) one minus the predicted probability of the complement (i.e., 56.33%) since both probability assessments measure the same outcome (i.e., the event) (see Table 11 – Panel A). Thus, the smaller the difference between the two mean probability assessments, the closer the sum of the assessment of the event-probability and the complement-probability should be to 1 (i.e., 100%). That is, by comparing the means for measured event probability assessments with those of the implied event probability assessments, the degree to which mean event-probabilities and mean complement-probabilities do not sum to 1 (and thus do not form perfect complements) can be inferred in spite of the fact that responses cannot be matched up in a between-subjects experiment. A larger discrepancy between the predicted probability of the event and the predicted probability of the complement (subsequently converted into the implied probability of the event) thus suggests a testable measure of bias in the judgment of auditors who have adopted an abstract mindset orientation.

Contrary to expectations, the ANOVA results reported in Table 11 - Panel B do not support the predicted MINDSET by FOCUS interaction ( $F = .018$ , one-tailed  $p = .447$ ). H2 is therefore not supported. ANOVA results further show an unexpected significant main effect (not hypothesized) for FOCUS ( $F = 8.831$ , one-tailed  $p = .002$ ). A tentative interpretation of this finding is offered in the additional analyses section.

---

term, the results are qualitatively identical to those of the full sample ANOVA. Accordingly, full sample size ANOVA results are reported.

Table 11: Results - Experiment 1: H2

<b>Panel A: Descriptive Statistics – Mean (Standard Deviation) [Sample Size]</b>			
	<b>Focus</b>		<b>Overall</b>
<b><u>Mindset Orientation</u></b>	<b><u>Event</u></b>	<b><u>Complement</u></b>	<b>Mindset Orientation</b>
Concrete	68.84 (12.53) [25]	56.33 (25.14) [21]	63.13 (20.11) [46]
Abstract	61.43 (18.85) [21]	47.74 (25.12) [23]	54.27 (23.15) [44]
Overall Focus	65.46 (15.99) [46]	51.84 (25.21) [44]	58.80 (21.98) [90]

<b>Panel B: Results of ANOVA with Event Probability Assessment as Dependent Measure</b>					
<b><u>Source</u></b>	<b><u>S.S</u></b>	<b><u>d.f.</u></b>	<b><u>M.S.</u></b>	<b><u>F-Ratio</u></b>	<b><u>p-value<sup>a</sup></u></b>
Mindset Orientation <sup>b</sup>	1433.446	1	1433.446	3.297	.037
Focus <sup>c</sup>	3839.806	1	3839.806	8.831	.002
Mindset Orientation * Focus	7.828	1	7.828	.018	.447
Error	37391.604	86	434.786		
Total	354168.000	90			

<sup>a</sup> One-tailed significance level

<sup>b</sup> Mindset orientation was manipulated between participants at two levels: abstract and concrete. In the ‘abstract’ condition, participants performed a categorization task related to fraud risk factors. In the ‘concrete’ condition, participants performed a fraud risk factor significance evaluation task.

<sup>c</sup> Focus was manipulated by varying the dependent variable measure question. In the ‘event’ condition participants were asked, “Based on the above information, what is your estimate of the probability that the receivable will be **collectible** next year?” In the ‘complement’ condition participants were asked, “Based on the above information, what is your estimate of the probability that the receivable will be **uncollectible** next year?” Participants responded on a sliding scale with a minimum of 0% and a maximum of 100%. Percentages selected were displayed and recorded at each 1% increment.

## Experiment 2

### Participants

A total of 118 undergraduate accounting students were recruited for Experiment 2 and completed the experimental material online. Participants’ mean age was 26.1 years and mean

years of work experience was 4.8 years.<sup>16</sup> The sample consists of 57 male (48.3%) and 61 female (51.7%) students. One-hundred and thirteen students (95.8%) indicated that they have taken (or are currently taking) an audit class. With respect to students' intention to work as an auditor upon graduation, 26 participants (22.0%) answered "Yes", 32 (27.1%) answered "No", and the remaining 60 students (50.8%) answered "Don't know". No significant differences with respect to any of the demographic measures (age, gender, audit class taken or in progress, work experience, and intention to work as an auditor) exists across experimental conditions, (all p-values > 0.28). Table 12 presents the demographic information.

Table 12: Demographics - Experiment 2

---

<b>(N = 118)</b>	
<b>Age</b>	
Mean	26.1
Median	22.0
Minimum	19.0
Maximum	56.0
Standard Deviation	8.0
<b>Years of work experience</b>	
Mean	4.8
Median	2.0
Minimum	0.0
Maximum	33.0
Standard Deviation	6.2

---

<sup>16</sup> Audit experience (incl. internships) among participants was very low (mean = 1 month) (untabulated).

---

	<u>Number</u>	<u>Percent</u>
<b>Gender</b>		
Male	57	48.3%
Female	61	51.7%
<b>Audit class taken or in progress</b>		
Yes	113	95.8%
No	5	4.2%
<b>Intention to work as an auditor</b>		
Yes	26	22.0%
No	32	27.1%
Don't know	60	50.8%

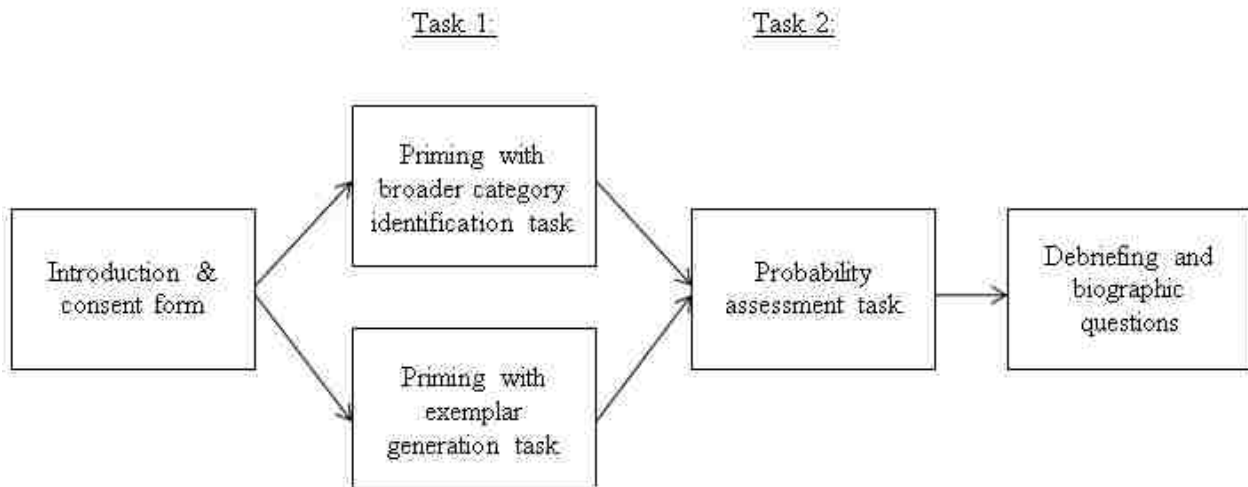
---

#### Experimental Procedure

Experiment 2 is designed to provide further evidence that construal mindset rather than the nature of the experimental audit task drives participants' probability assessment. While Experiment 1 was designed to illustrate that thinking about broad categories in a realistic audit context induces an abstract mindset orientation and subsequently affects auditors' judgment, it could be argued that such categorization tasks are the *only* tasks that would lead to the hypothesized effects. Support of the hypotheses through Experiment 2 would thus broaden the generalizability of the results from Experiment 1 and suggest that *other* audit tasks that prompt the adoption of an abstract mindset orientation may similarly affect auditors' subsequent judgment. In Experiment 2, a construal mindset priming task developed and tested in the psychology literature (Freitas et al. 2004; Fujita et al. 2006b – Experiment 3; Wakslak and Trope 2009 – Study 2) was administered prior to asking participants to render their probability assessment in Task 2 (for a description of Task 2 refer to Experiment 1). Experiment 2 thus differs from Experiment 1 with respect to Task 1 as it uses a cognitive priming task rather than

an auditing-related task in order to manipulate the independent variable *construal mindset*. Participants were exposed to the *same* probability assessment task as participants in Experiment 1. Given that Task 1 involves a psychology-based mindset manipulation, the use of student subjects for Experiment 2 is justified. The psychology-based mindset manipulation of Task 1 also serves as a robustness test for the corresponding Task 1 in Experiment 1.

The cognitive priming task for the abstract mindset condition required participants to complete 30 sentences by generating a superordinate category for the capitalized word (e.g., *COLLEGE*, *SENATOR*) within each sentence (e.g., “A \_\_\_\_\_ is an example of \_\_\_\_\_”). Participants in the concrete mindset condition completed 30 sentences by generating a subordinate exemplar for the capitalized word within each sentence (e.g., “An example of a SPORT is \_\_\_\_\_”). The second task (Task 2) and the associated manipulation of the independent variable *focus* were identical to Experiment 1. Figure 7 depicts the experimental procedures and Table 13 summarizes the four conditions. The experimental material is illustrated in Appendix B.



**Notes:**

This figure illustrates the experimental procedures for Experiment 2 wherein participants in the abstract mindset orientation condition are primed with a broader category identification task and participants in the concrete mindset orientation condition are primed with an exemplar generation task.

Figure 7: Experimental Procedures - Experiment 2

Table 13: Experimental Conditions - Experiment 2

<u>Condition</u>	<u>Mindset Orientation</u>	<u>Priming Method (Task 1)</u>	<u>Focus of Probability Assessment Task</u>
1	Abstract	Broader category identification task	Event
2	Abstract	Broader category identification task	Complement
3	Concrete	Exemplar generation task	Event
4	Concrete	Exemplar generation task	Complement

This table illustrates the four conditions of the experimental material and relates the mindset orientation manipulation to the respective version of Task 1. The focus of the probability assessment task is manipulated within Task 2.

## Debriefing Questions

Student participants completed the same audit task categorization exercise as the auditors in Experiment 1 (see debriefing questions for Experiment 1). However, students were not asked to classify their version of Task 1 as either requiring abstract or concrete thinking since no additional insights were expected to result from such inquiry. The sole purpose for including the task was to further validate the researcher's subjective classification of the ten described audit tasks. Overall, agreement between the student participants' classifications and those of the researcher was high (mean: 8.8 out of 10 'correctly' classified; no difference between conditions:  $p = .795$ ).

## Results

Similar to the analysis for Experiment 1, a  $t$ -test comparing the mean probabilities assessed by participants in the 'concrete mindset / event' condition with those of the 'abstract mindset / event' condition was conducted. On average, participants in the concrete mindset condition assessed the probability that the accounts receivable will be **collectible** higher (mean = 64.41, s.d. = 14.62) than participants in the abstract mindset condition (mean = 60.33, s.d. = 16.84). Although this difference was not statistically significant ( $t_{57} = .993$ , one-tailed  $p = .163$ ), effect size estimates suggest a small effect ( $d = .26$ ;  $r = .13$ ) (Cohen 1988, 1992). The downward sloping trend line shown in Figure 8 illustrates this effect. H1 is not supported.



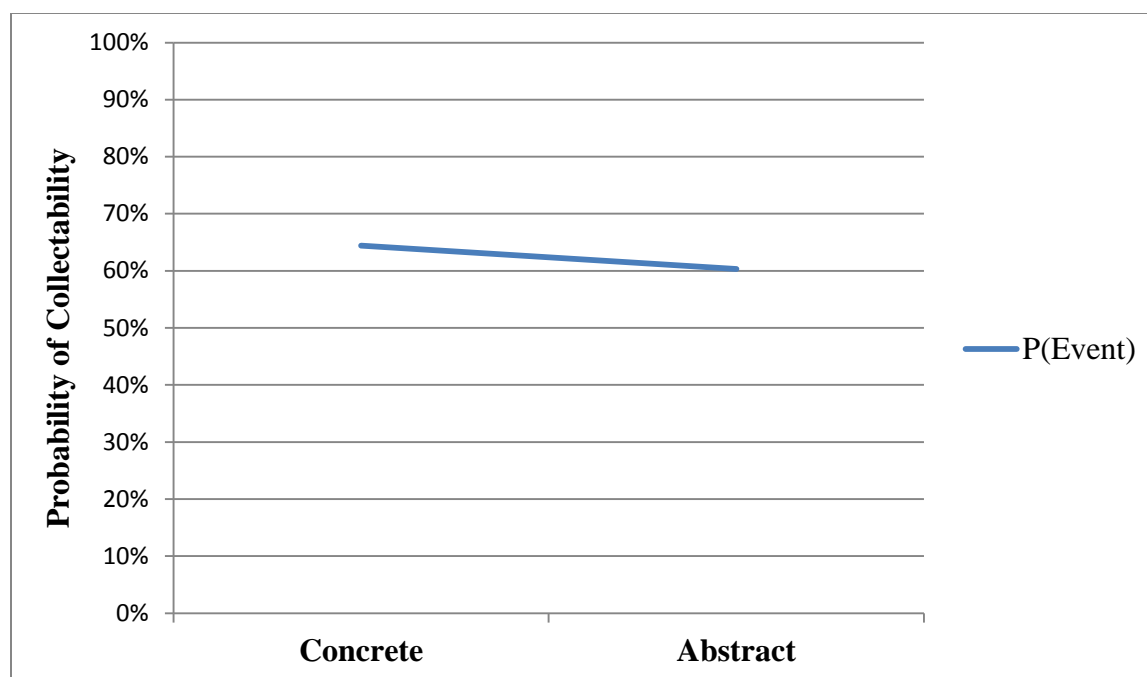


Figure 8: Estimated Means - Experiment 2: H1

Table 14: Results - Experiment 2: H1

T-Test Results								
							Effect Size	
Condition	N	Mean	S.D.	t	df	p-value <sup>a</sup>	d	r
Concrete / Event	29	64.41	14.62	.993	57	.163	.26	.13
Abstract / Event	30	60.33	16.84					

<sup>a</sup> One-tailed significance level

Recall that H2 predicts that the combined probability assessments for the occurrence and the non-occurrence of an event will be closer to 1 for participants who have adopted a concrete mindset orientation than for participants who have adopted an abstract mindset orientation. As such, H2 predicts an interaction between MINDSET and FOCUS.

Participants' mean probability assessments are graphically depicted in Figure 9. As explained in connection with the corresponding Figure 6 in Experiment 1, both lines in Figure 9 represent participants' "event" assessment even though the hyphenated line is derived (i.e.,

calculated as 1 minus probability of complement). While the hyphenated line has the predicted upward slope, it lies below the solid line. The overall pattern shown in Figure 9 thus deviates from expectations illustrated in Figure 3.

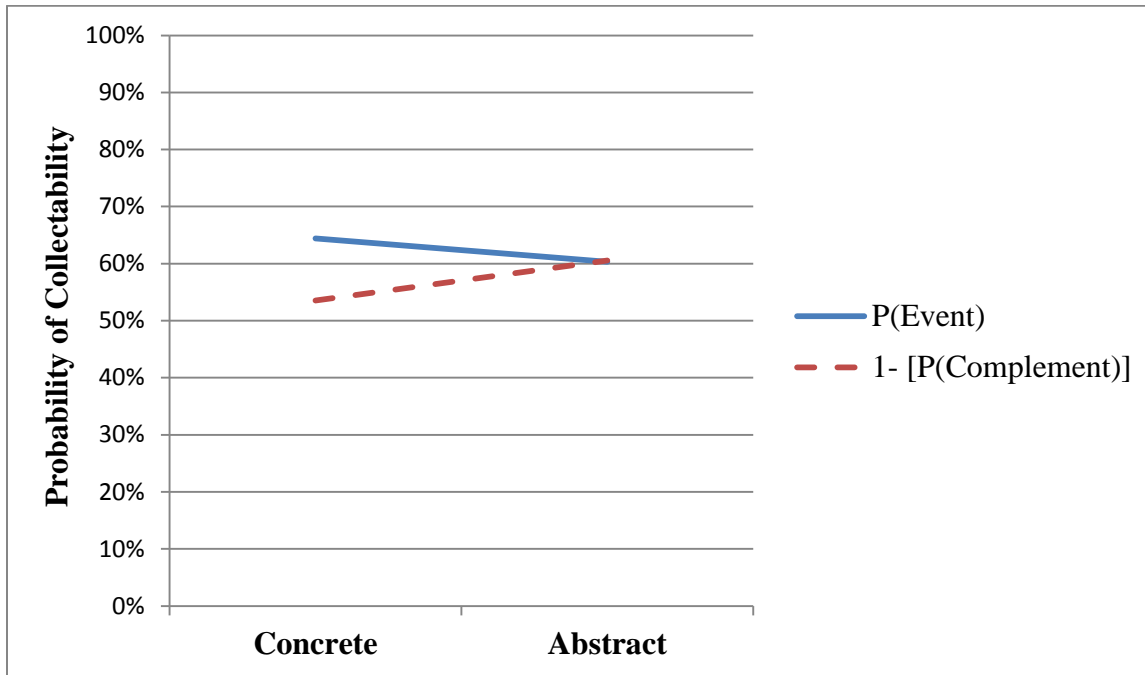


Figure 9: Estimated Means - Experiment 2: H2

To test H2, data from the complete sample ( $n = 118$ ) was used. As in Experiment 1, probability assessments provided by participants in the complement conditions were transformed into implied event probability assessments (i.e., calculated as 1 minus probability of complement) such that all responses relate to the same dependent variable measure and thus permit ANOVA testing.

Prior to conducting hypothesis testing for H2 via traditional ANOVA, a linear regression (untabulated) was performed in order to identify potential covariates. All demographic variables (age, gender, audit class taken or in progress, audit experience, non-audit work experience, and intentions to work as an auditor) were simultaneously regressed on the dependent variable

probability assessment. As none of the demographic variables was significant, the ANOVA results reported below do not incorporate covariates.

Table 15 – Panel A shows descriptive statistics for the participants’ probability assessment concerning the collectability of accounts receivable under each of the four treatment conditions. ANOVA results shown in Table 15 - Panel B show a moderately significant effect for the predicted MINDSET by FOCUS interaction ( $F = 2.622$ , one-tailed  $p = .054$ ). However, H2 lacks support since combined probability assessments for the event and the complement appear closer for auditors who have adopted an abstract mindset orientation. Moreover, similar to the results reported for Experiment 1, Table 15 - Panel B shows an unexpected moderately significant main effect (not hypothesized) for FOCUS ( $F = 2.436$ , one-tailed  $p = .061$ ). A tentative interpretation of this finding is offered in the additional analyses section.

Table 15: Results - Experiment 2: H2

<b>Panel A: Descriptive Statistics – Mean (Standard Deviation) [Sample Size]</b>			
	<b>Focus</b>		<b>Overall</b>
<b><u>Mindset Orientation</u></b>	<b><u>Event</u></b>	<b><u>Complement</u></b>	<b>Mindset Orientation</b>
Concrete	64.41 (14.62) [29]	53.55 (21.92) [29]	58.98 (19.26) [58]
Abstract	60.33 (16.84) [30]	60.53 (19.97) [30]	60.43 (18.31) [60]
Overall Focus	62.34 (15.78) [59]	57.10 (21.07) [59]	59.72 (18.72) [118]

<b>Panel B: Results of ANOVA with Event Probability Assessment as Dependent Measure</b>					
<b>Source</b>	<b>S.S</b>	<b>d.f.</b>	<b>M.S.</b>	<b>F-Ratio</b>	<b>p-value<sup>a</sup></b>
Mindset Orientation <sup>b</sup>	62.055	1	62.055	.180	.336
Focus <sup>c</sup>	838.147	1	838.147	2.436	.061
Mindset Orientation * Focus	902.215	1	902.215	2.622	.054
Error	39220.340	114	344.038		
Total	461843.000	118			

<sup>a</sup> One-tailed significance level

<sup>b</sup> Mindset orientation was manipulated between participants at two levels: abstract and concrete. In the ‘abstract’ condition, participants were primed with a broader category identification task adopted from the psychology literature. In the ‘concrete’ condition, participants were primed with an exemplar generation task adopted from the psychology literature.

<sup>c</sup> Focus was manipulated by varying the dependent variable measure question. In the ‘event’ condition participants were asked, “Based on the above information, what is your estimate of the probability that the receivable will be **collectible** next year?” In the ‘complement’ condition participants were asked, “Based on the above information, what is your estimate of the probability that the receivable will be **uncollectible** next year?” Participants responded on a sliding scale with a minimum of 0% and a maximum of 100%. Percentages selected were displayed and recorded at each 1% increment.

### Additional Analyses

Given the unexpected significant main effect for independent variable FOCUS in both experiments and the absence of a significant interaction effect in Experiment 1, additional testing was performed in order to shed light into those results. Post-hoc tests explore the discussion connecting H1 and H2, that is, the prediction that individuals who have adopted an abstract mindset orientation also assess complement probabilities to be lower than individuals who have adopted a concrete mindset orientation. In other words, post-hoc tests compare the mean probability assessments provided by participants in the ‘concrete mindset / complement’ condition with those provided by participants in the ‘abstract mindset / complement’ condition. As such, the post-hoc tests offer a direct measure of an implicit assumption inherent to H2. Given that post-hoc tests were conducted with approximately half the sample size each, weaker effect sizes are expected.

A *t*-test applied to data from Experiment 1 reveals that, on average, auditors in the concrete mindset condition assessed the probability that the accounts receivable will be **uncollectible** lower (mean = 43.67, s.d. = 25.14) than auditors in the abstract mindset condition (mean = 52.26, s.d. = 25.12). While the means compared in this *t*-test point in directions that contradict the aforementioned discussion, the difference was not statistically significant ( $t_{42} = 1.113$ , one-tailed  $p = .132$ ).<sup>17</sup> Table 16 – Panel A illustrates those results.

A corresponding *t*-test applied to data from Experiment 2 reveals a different pattern. On average, participants in the concrete mindset condition assessed the probability that the accounts receivable will be **uncollectible** higher (mean = 46.45, s.d. = 21.92) than participants in the abstract mindset condition (mean = 39.47, s.d. = 19.97), in support of the argumentation leading to H2. While the difference was not statistically significant ( $t_{57} = 1.280$ , one-tailed  $p = .103$ ), effect size estimates suggest a small effect ( $d = .33$ ;  $r = .17$ ) in the predicted direction (Cohen 1988, 1992). Table 16 – Panel B illustrates those results.

---

<sup>17</sup> The small effect size based on Cohen's *d* and Pearson's correlation coefficient does not support the prediction derived from CLT since the higher mean is associated with the abstract mindset orientation condition.

Table 16: Post-hoc Tests

<b>Panel A: Experiment 1</b>									
								<b>Effect Size</b>	
<b>DV (Probability Question)</b>	<b>Condition<sup>a</sup></b>	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>t</b>	<b>df</b>	<b>p</b>	<b>d</b>	<b>r</b>
Based on the above information, what is your estimate of the probability that the receivable will be <u>uncollectible</u> next year?	C / C	21	43.67	25.14	1.113	42	.132	.34	.17
	A / C	23	52.26	25.12					

<b>Panel B: Experiment 2</b>									
								<b>Effect Size</b>	
<b>DV (Probability Question)</b>	<b>Condition<sup>a</sup></b>	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>t</b>	<b>df</b>	<b>p</b>	<b>d</b>	<b>r</b>
Based on the above information, what is your estimate of the probability that the receivable will be <u>uncollectible</u> next year?	C / C	29	46.45	21.92	1.280	57	.103	.33	.17
	A / C	30	39.47	19.97					

<sup>a</sup> C/C = Concrete/Complement; A/C = Abstract/Complement

With respect to Experiment 1, the primary analysis for testing H1 combined with the above reported *t*-test suggest that H1 is supported for auditors who assess the probability of an event, but not for auditors who assess the event's complement. A potential explanation for this finding may be that the probability assessment predictions derived from CLT only hold when decision-makers evaluate a familiar hypothesis.<sup>18</sup> While it remains an empirical question, it could be argued that experienced auditors are more accustomed to judge the **collectability** of accounts receivable than the **uncollectibility**.<sup>19</sup> The notably higher variances in the complement conditions (overall variance: 25.21) compared to those in the event conditions (overall variance: 15.99) seems to support the conclusion that presenting auditors with a non-customary hypothesis takes them out of routine cognition mode and thus outside the domain of CLT.

This conclusion would also permit reconciliation of the results reported for Experiment 1 and those for Experiment 2. Even though a firmly-established psychology task was utilized in order to prime student participants with either an abstract or concrete mindset orientation, the observed effects on probability judgments did not cross into statistical significance. The rather small effect sizes detected in both *t*-tests (i.e., in primary analysis and in post-hoc testing) could be interpreted as an indication that the accounts receivable task was outside the routine decision domain of at least some student participants and thus outside the domain of CLT with respect to those subjects. Moreover, while the overall variance in the complement conditions (21.07 – see

---

<sup>18</sup> The extant CLT literature on probability related judgments (e.g., Todorov et al. 2006, Wakslak and Trope 2009, Wakslak 2012) uses predominantly undergraduate students as participants and examines judgments encountered in everyday situations (e.g., the prediction of whether a highly unlikely gambling outcome would occur in the near or distant future). Moreover, the only study that directly investigates how construal level affects probability estimates, Wakslak and Trope (2009), uses exclusively students who render rather ordinary judgments such as the likelihood that an item is on sale or that someone is going to do something (see Wakslak and Trope 2009). The generalizability of findings from the aforementioned psychology studies to situations in which decision-makers are confronted with a non-routine probability judgment may thus be limited.

<sup>19</sup> A focus on uncollectibility seems more appropriate for the evaluation of the account “Allowance for Uncollectible Accounts”.

Table 15 – Panel A) was also higher than the overall variance in the event conditions (15.78 – see Table 15 – Panel A), the discrepancy was less prominent than in Experiment 1 (25.21 and 15.99, respectively – see Table 11 Panel A). This may suggest that the effect of FOCUS on probability assessment is less pronounced for students than for auditors who may be well-accustomed to thinking about collectability. ANOVA results reported in Table 11 – Panel B and Table 15 – Panel B support this conclusion: FOCUS is statistically significant at the .05 level in Experiment 1 (one-tailed p-value = .002) but only at the .1 level in Experiment 2 (one-tailed p-value = .061). Moreover, even for student participants for whom the assessment of probabilities related to accounts receivable constitutes a rather non-routine task in general, the assessment of **uncollectibility** of accounts receivable may seem even more unnatural than the assessment of **collectability**.

While this interpretation of post-hoc results tentatively points to additional domain limitations of CLT, such findings should not be considered unusual. As noted in the introduction to this manuscript, a corresponding conclusion was drawn by Trotman and Wright (2000) with respect to the predictions associated with order and recency effects applied to an audit setting. Accordingly, further exploration of the applicability of CLT-derived predictions with respect to probability assessments seems warranted.

#### Supplemental and Exploratory Measures

Participants in both experiments also responded to four additional questions incorporated for exploratory purposes. The first question is closely related to the primary dependent variable and asks participants to indicate whether they believe that “...the accounts receivable balance is materially misstated?” (Yes/No format). Chi-square tests for independence of classification



reveal no significant relationship between independent variable FOCUS and participants' perception of whether or not the accounts receivable balance is materially misstated (Experiment 1:  $X^2 = 2.333$ , two-tailed p-value = .127; Experiment 2:  $X^2 = .035$ , two-tailed p-value = .851). Responses to the aforementioned question, which presumably provides a better indication of participants' intention to adjust further audit steps, were further used to determine whether FOCUS affects participants' ability to sufficiently align their binary decision with their corresponding probability judgment rendered for the primary dependent variable question. That is, participants who estimated the probability that the receivable will be collectible to be *lower* than 50% should have answered "Yes" while those who provided probability assessments *larger* than 50% should have answered "No".<sup>20</sup> Results (untabulated) indicate that approximately two-thirds of participants rendered a choice that is consistent with their probability assessment (Experiment 1: 66.20%; Experiment 2: 64.20%). No significant difference between participants in the 'event' condition and those in the 'complement' condition with respect to choice consistency exists (Experiment 1:  $p = .941$ ; Experiment 2:  $p = .352$ ). Overall, those results suggest that the majority of participants seem to incorporate their prior probability assessment into a subsequent decision that may have important consequences for further audit procedures. The focus of the probability assessment question did not seem to affect their ability to do so.

The remaining three questions called for probability assessments on a sliding scale with a minimum of 0% and a maximum of 100%, similar to the primary dependent variable measure. However, none of the three questions could be reasonably answered based on the information provided in the case scenario for Task 1 (client Premier Electro Tech). Those questions are: 1. "What is your estimate of the probability that the controller of Premier Electro Tech will try to

---

<sup>20</sup> Participants who estimated exactly 50% were ignored for purposes of this analysis.

overstate collectibles?"; 2. "What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?"; and 3. "What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?" The purpose of those questions was to explore whether the hypothesized MINDSET effects on participants' probability judgment carry over to additional probability judgments. Responses from *both* experiments suggest that none of the questions prompted statistically significant *lower* probability assessments for participants who have adopted an abstract mindset. Given the exploratory nature of the four additional questions, the further interpretation of those results is left to future inquiry. Table 17 summarizes the results for Experiment 1 (Panel A) and Experiment 2 (Panel B).

Table 17: Additional Questions

**Panel A: Experiment 1**

**Test of Independence between Focus and Perception of Material Misstatement<sup>a</sup>**

<b><u>Focus</u></b>		<b><u>Yes</u></b>	<b><u>No</u></b>	<b><u>Total</u></b>
Event	Count	23	23	46
	Expected Count	26.6	19.4	46
	% within Focus	50.0%	50.0%	100%
Complement	Count	29	15	44
	Expected Count	25.4	18.6	44
	% within Focus	65.9%	34.1%	100%
Total	Count	52	38	90
	Expected Count	52	38	90
	% within Focus	40.0%	60.0%	100%
Chi-square (d.f. = 1)				<b>2.333</b>
p-value (two-tailed)				<b>.127</b>

<b>Probability Question</b>	<b>Mindset</b>	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>t</b>	<b>df</b>	<b>p<sup>b</sup></b>	<b>Effect Size</b>	
								<b>d</b>	<b>r</b>
What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?	Concrete	46	41.11	26.47	2.322	88	.023	.49	.24
	Abstract	44	54.45	28.06					
What is your estimate of the probability that the “new computerized accounting system” installed by Premier Electro Tech’s customer will work as expected?	Concrete	46	56.24	22.19	1.232	88	.221	.26	.13
	Abstract	44	61.77	20.32					
What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?	Concrete	46	54.26	26.61	.337	88	.737	.07	.04
	Abstract	44	56.23	28.73					

<sup>a</sup> Participants responded to the following forced choice item: “Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?” Response options: “Yes”, “No”.

<sup>b</sup> Two-tailed significance level

---

**Panel B: Experiment 2**

**Test of Independence between Focus and Perception of Material Misstatement<sup>a</sup>**

<b><u>Focus</u></b>		<b><u>Yes</u></b>	<b><u>No</u></b>	<b><u>Total</u></b>
Event	Count	24	35	59
	Expected Count	23.5	35.5	59
	% within Focus	40.7%	59.3%	100%
Complement	Count	23	36	59
	Expected Count	23.5	35.5	59
	% within Focus	39.0%	61.0%	100%
Total	Count	47	71	118
	Expected Count	47	71	118
	% within Focus	40.0%	60.0%	100%
Chi-square (d.f. = 1)				<b>.035</b>
p-value (two-tailed)				<b>.851</b>

---

								<b>Effect Size</b>	
	<b>Mindset</b>	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>t</b>	<b>df</b>	<b>p<sup>b</sup></b>	<b>d</b>	<b>r</b>
<b>Probability Questions</b>									
What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?	Concrete	58	49.55	23.38	.335	116	.369	.06	.03
	Abstract	60	47.97	27.73					
What is your estimate of the probability that the “new computerized accounting system” installed by Premier Electro Tech’s customer will work as expected?	Concrete	58	55.21	18.39	.758	116	.225	.14	.07
	Abstract	60	57.97	21.02					
What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?	Concrete	58	55.50	23.43	.060	116	.477	.01	.01
	Abstract	60	55.78	27.90					

<sup>a</sup> Participants responded to the following forced choice item: “Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?” Response options: “Yes”, “No”.

<sup>b</sup> Two-tailed significance level

## Conclusion

This study draws on CLT in order to investigate how the performance of common auditing tasks that require varying degrees of abstract thinking affect decision-makers' overall mindset and hence their subsequent judgment even if the latter is neither related to the same client nor to the domain of the preceding task. It is predicted that participants who have adopted an abstract mindset orientation as a result of an unrelated preceding task provide lower probability estimates concerning the ability of an audit client to collect a customer's accounts receivable balance than participants who have adopted a concrete mindset orientation. Given that CLT also suggests that this result holds regardless of whether the probability assessment is focused on the *collectability* of accounts receivable or the *uncollectibility* of accounts receivable, it is further predicted that combined probability assessments (i.e., the sum of probability estimates concerning the *collectability* and those concerning the *uncollectibility* of accounts receivable) are farther from 1 for participants who have adopted an abstract mindset orientation.

Results from two experiments, one using experienced auditors and one using student participants, are mixed. In Experiment 1, auditors who adopt an abstract mindset orientation as a result of an unrelated preceding audit task, compared to those who adopt a concrete mindset orientation, provide lower probability assessments. However, no support is found for the hypothesized interaction. In Experiment 2, student participants who adopt an abstract mindset orientation as a result of a construal mindset priming task, compared to those who adopt a concrete mindset orientation, do not provide lower probability assessments. Moreover, the hypothesized interaction effect is not supported. Additional analyses suggest that the probability-related predictions derived from CLT may be limited to situations in which the judgment of

concern is relatively familiar to the decision-maker in terms of decision domain and how the judgment question is posed.

A limitation to the present study is that the nature of the research question necessitated a between-subjects design and the evaluation of implied probability assessments for approximately half of the participants. The detected effects reported in the main analysis may thus be artificially small. Another shortcoming to this study is that the extent to which participants paid attention to their respective tasks could not be consistently measured. Accordingly, it is possible that the intended mindset orientation manipulation did not work for some participants. If the number of participants who did not pay close attention to the mindset manipulation task (i.e., Task 1) varied by condition, the reported results may have been affected. Lastly, the online administration of the experimental material did not prevent participants from taking a break between the mindset manipulation task and the subsequent probability assessment task. As a consequence, the initiated mindset orientation may have been reversed, depending on the nature of the activity in which the participant engaged during the interruption.

In spite of those limitations and the mixed results discussed above, the findings from this research make several important contributions. By demonstrating that the abstractness of a preceding task can lower customarily encountered probability judgments, the present study draws attention to potentially biased decision-making among audit professionals. Given the pervasiveness of likelihood judgments in professional decision-making, the reported results may be of interest to a broad range of practitioners and academics. Moreover, the study identifies a potential scope limitation associated with the probability-related predictions derived from CLT. Construal mindset orientation may only affect subsequent probability assessments when the judgment of concern is relatively familiar to the decision-maker in terms of how the judgment



question is posed. This tentative conclusion may be of interest to psychology researchers and accounting academics alike.

Through a focus on the effects of task-induced mindset on subsequent decisions in a multi-task, multi-client environment the study follows Bhattacharjee et al.'s (2007) call for additional research on situations in which individuals render sequential judgments about diverse targets. The study's focus on auditors' mindset suggests the possibility for future research to explore similar task-induced mindset implications for professional decision-makers in audit-relevant contexts. If the robust results documented in the psychology literature translate into the accounting domain, an abstract mindset may also be prompted by accounting tasks that require the decision-maker to compare objects with nonalignable rather than alignable features (e.g., potential merger targets operating in different industries); to consider the *why* rather than the *how* aspects of a given situation (e.g., questioning the motives for a proposed joint venture rather than focusing on implementation steps); to adopt another person's perspective; or to envision making a decision in the distant future. Accordingly, research could explore whether tasks other than broad categorization prompts an abstract mindset and hence leads to the probability assessment patterns found in this study.

Another promising area for future research might be to build directly on CLT research which investigates the mental associations among various dimensions of psychological distance. For example, Wakslak (2012), who highlights the importance of understanding the relationship between hypotheticality and spatial / temporal distance, finds that individuals anticipate that less [more] likely events happen at remote [proximate] locations and in the distant [near] future. Accounting researchers could thus explore how tax professionals assess the probability that a remote versus proximate client will be able to successfully defend a proposed tax position in

court; how partners assess the likelihood that a bid for a proximate versus remotely located audit or consulting client will be accepted; and, in the context of risk management, how risk managers assess the likelihood that a catastrophic event occurs in the distant versus near future. Exploring the association between social distance and the aforementioned distance dimensions in various accounting contexts similarly offers a host of research opportunities.

## References

- Bar-Anan, Y., N. Liberman, and Y. Trope. 2006. The association between psychological distance and construal level: Evidence from an implicit association test. *Journal of Experimental Psychology: General* 135 (4): 609-622.
- Bhattacharjee, S., M. J. Maletta, and K. K. Moreno. 2007. The cascading of contrast effects on auditors' judgments in multiple client audit environments. *The Accounting Review* 82 (5): 1097-1117.
- Bhattacharjee, S., M. J. Maletta, and K. K. Moreno. 2013. Auditors' judgment errors when working on multiple tasks and in multiple client environments: A research summary and practice implications. *Current Issues in Auditing* 7 (1): 1-8.
- Favere-Marchesi, M. 2013. Effects of decomposition and categorization on fraud-risk assessments. *Auditing: A Journal of Practice & Theory* 32 (4): 201-219.
- Cohen, J. 1988. *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). New Jersey: Lawrence Erlbaum Associates.
- Cohen, J. 1992. A power primer. *Psychological Bulletin* 112 (1): 155-159.
- Freitas, A. L., P. Gollwitzer, and Y. Trope. 2004. The influence of abstract and concrete mindsets on anticipating and guiding others' self-regulatory efforts. *Journal of Experimental Social Psychology* 40 (6): 739-752.
- Fujita, K., and H. A. Han. 2009. Moving beyond deliberative control of impulses. The effect of construal levels on evaluative associations in self-control conflicts. *Psychological Science* 20 (7): 799-804.
- Fujita, K., M. D. Henderson, J. Eng, Y. Trope, and N. Liberman. 2006a. Spatial distance and mental construal of social events. *Psychological Science* 17 (4): 278-282.
- Fujita, K., Y. Trope, N. Liberman, and M. Levin-Sagi. 2006b. Construal levels and self-control. *Journal of Personality and Social Psychology* 90 (3): 351-367.
- Glass, G.V., Peckham, P.D., and Sanders, J.R. 1972. Consequences of failure to meet assumptions underlying the fixed effects analyses of variance and covariance. *Review of Educational Research* 42 (3): 237-288.
- Grossman, A. M., and R. B. Welker. 2011. Does the arrangement of audit evidence according to causal connections make auditors more susceptible to memory conjunction errors? *Behavioral Research in Accounting* 23 (2): 93-115.

- Hogarth, R. M., and H. J. Einhorn. 1992. Order effects in belief updating: The belief-adjustment model. *Cognitive Psychology* 24 (1): 1-55.
- Joyce, E. J., and G. C. Biddle. 1981. Are auditors' judgments sufficiently regressive? *Journal of Accounting Research* 19 (2): 323-349.
- Liberman, N., and Y. Trope. 1998. The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology* 75 (1): 5-18.
- Liberman, N., and Y. Trope. 2008. The psychology of transcending the here and now. *Science* 322 (5905): 1201-1205.
- Liberman, N., M. D. Sagristano, and Y. Trope. 2002. The effect of temporal distance on level of mental construal. *Journal of Experimental Social Psychology* 38: 523-534.
- Liberman, N., Y. Trope, and E. Stephan. 2007. Psychological distance. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2, pp. 353–383). New York, NY: Guilford Press.
- Lindberg, D. L., and M. J. Maletta. 2003. An examination of memory conjunction errors in multiple client audit environments. *Auditing: A Journal of Practice & Theory* 22 (1): 127-141.
- Malkoc, S. A., G. Zauberan, and J. R. Bettman. 2010. Unstuck from the concrete: Carryover effects of abstract mindsets in intertemporal preferences. *Organizational Behavior and Human Decision Processes* 113 (2): 112-126.
- Mandel, D. R. 2005. Are risk assessments of a terrorist attack coherent? *Journal of Experimental Psychology: Applied* 11 (4): 277-288.
- Morrill, J. B., C. K. J. Morrill, and L. S. Kopp. 2012. Internal control assessment and interference effects. *Behavioral Research in Accounting* 24 (1): 73-90.
- Navon, D. 1977. Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology* 9 (3): 353-383.
- O'Donnell, E., and J. J. Schultz, Jr. 2005. The halo effect in business risk audits: Can strategic risk assessment bias auditor judgment about accounting details? *The Accounting Review* 80 (3): 921-939.
- Public Company Accounting Oversight Board (PCAOB). 2002. *Consideration of Fraud in a Financial Statement Audit*. AU Section 316. Washington, D.C. Available at: <http://pcaobus.org/standards/auditing/pages/au316.aspx>.

- Smith, P. K., and Y. Trope. 2006. You focus on the forest when you're in charge of the trees: Power priming and abstract information processing. *Journal of Personality and Social Psychology* 90 (4): 578-596.
- Todorov, A., A. Goren, and Y. Trope. 2007. Probability as a psychological distance: Construal and preferences. *Journal of Experimental Social Psychology* 43 (3): 473-482.
- Trope, Y., and N. Liberman. 2003. Temporal construal. *Psychological Review* 110 (3): 403-421.
- Trope, Y., and N. Liberman. 2010. Construal-level theory of psychological distance. *Psychological Review* 117 (2): 440-463.
- Trope, Y., N. Liberman, and C. Wakslak. 2007. Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior. *Journal of Consumer Psychology* 17 (2): 83-95.
- Trotman K. T., and A Wright. 2000. Order effects and recency: where do we go from here? *Accounting and Finance* 40 (2): 169-182.
- Wakslak, C. J., Y. Trope, N. Liberman, and R. Alony. 2006. Seeing the forest when entry is unlikely: Probability and the mental representation of events. *Journal of Experimental Psychology: General* 135 (4): 641-653.
- Wakslak, C., and Y. Trope. 2009. The effect of construal level on subjective probability estimates. *Psychological Science* 20 (1): 52-58.
- Wilks, T. J., and M. F. Zimbelman. 2004a. Using game theory and strategic reasoning concepts to prevent and detect fraud. *Accounting Horizons* 18 (3): 173-184.
- Wilks, T. J., and M. F. Zimbelman. 2004b. Decomposition of fraud-risk assessments and auditors' sensitivity to fraud cues. *Contemporary Accounting Research* 21 (3): 719-745.

## STUDY THREE: THE IMPACT OF SPATIAL DISTANCE AND RISK CATEGORY ON PROBABILITY ASSESSMENT

*There is no commonly accepted definition for the term risk – neither in the sciences nor in public understanding. All risk concepts have one element in common, however: the distinction between reality and possibility. If the future were either predetermined or independent of present human activities, the term ‘risk’ would make no sense.*

*Ortwin Renn, 1998*

### Introduction

With his 2007 bestselling book “The Black Swan – The Impact of the Highly Improbable” statistician and philosopher Nassim Taleb brought wide-spread attention to a risk category<sup>21</sup> that would, within months of the book’s first publication, catapult to the forefront of economic and financial concerns as a result of an event that profoundly influenced the discourse on risk management. The event is the global financial crisis and the risk category so superbly analyzed by Taleb is that of ‘black swan events’. Often referred to as *emerging* or *global risks*<sup>22</sup> in the practitioner and academic literature (e.g., PricewaterhouseCoopers 2009, 2013a,b; Ballou et al. 2011; Gates et al. 2012; World Economic Forum 2014), ‘black swans’ are highly improbable events with massive consequences that are only with hindsight easy to explain (Taleb, 2007). The ineffective management of such risks which arguably led to the economic meltdown of 2007-2008 had far-reaching consequences for risk management practice and board-level risk oversight.

---

<sup>21</sup> The term risk category is used to refer to the broad classes of risks with which an organization may be confronted. Examples include operational risks, macroeconomic risk, and strategic risks.

<sup>22</sup> Those terms are often used more loosely as they may not be limited to extremely low likelihood events.

Academic research on enterprise risk management (ERM)<sup>23</sup> is published in a variety of finance, accounting, and practitioner-oriented journals and spans archival methods, field-based case research, and survey studies. The two main streams of ERM literature are concerned with ERM performance aspects and ERM implementation differences, respectively.

The ERM performance literature stream finds a number of positive effects from the use of ERM, particularly for companies with high-quality ERM systems in place. One of the main dependent variables used by archival studies within this literature stream is firm value measured by Tobin's Q (e.g., Hoyt and Liebenberg 2011; McShane et al. 2011; Baxter et al. 2013). Other evidence for positive ERM effects comes from findings which suggest that ERM improves corporate governance (Baxter et al. 2013) and accountability (Gates et al. 2012); facilitates risk communication, management consensus, and decision-making (Gates et al. 2012); and increases an organization's ability to adapt to new regulatory requirements (Arnold et al. 2011). From an extended-enterprise perspective, ERM is credited for reducing B2B risk and associated global business risk (Arnold et al. 2012); building trust in such relationships (Arnold et al. 2014); and for improving the chances for entering into successful support service outsourcing agreements (Raiborn et al. 2009).

The literature stream concerned with ERM implementation differences is mostly comprised of case studies and focuses on the organizational actors responsible for successful ERM deployment (e.g., Beasley et al. 2005; Arena et al. 2010); the effect of various organizational cultures and ERM styles on ERM functionality (e.g., Mikes 2009, 2011); and the

---

<sup>23</sup> This article does not distinguish between ERM and 'strategic' ERM. COSO (2004) defines ERM as follows: Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives. For a definition of 'strategic' ERM see Frigo and Anderson (2011).

evolution of ERM over time (e.g., Arena et al. 2010). While several of these studies make reference to the risk assessment process, they devote little attention to the psychological factors affecting corporate decision-makers' assessment of critical risks with respect to the most prominent criteria used in risk management practice: likelihood of occurrence and organizational impact (COSO 2004, 2013). To address this shortcoming, the present research strives to open the 'black box' representing the probability assessment module within the risk assessment process described by the Committee of Sponsoring Organizations of the Treadway Commission 2004 *Enterprise Risk Management – Integrated Framework* (hereafter, COSO 2004).

The purpose of this study is to investigate how spatial distance from a risk assessment target and the nature of the risk under consideration (i.e., risk category or risk type) affects decision-makers' assessment of the likelihood that the risk will materialize. Inspiration for this research stems both from a COSO-commissioned thought paper targeted at board members and academic calls for research on risk assessment tools. While the COSO-commissioned research study by KPMG LLP alerts board members to various judgment traps and biases and thus highlights the importance of identifying other potential factors that may introduce judgment bias (KPMG 2012), academic inquiry by Jordan et al. (2013) encourages additional research on risk management tools such as risk registers. Furthermore and closely related to risk register research is an earlier call for research by Ballou et al. (2011) who note that it would be informative to know whether *risk category* affects how risks are assessed or prioritized. Those authors also argue that board members would like to receive more information about actual ERM processes - including procedures related to the estimation of *risk probability*.

Enhanced understanding of the risk assessment process is critical as recent survey data by PricewaterhouseCoopers (PwC) suggests that a majority of corporations fail to properly match



risk exposure with resources devoted to risk management efforts (PwC 2009). According to the PwC study, this mismatch is most clearly reflected in under-resourcing of strategic and low-probability, high-impact emerging risks compared to the more familiar risk categories of financial, operational, and compliance risks (PwC 2009). Those findings appear startling given that the increased pressure on boards worldwide to improve their oversight of risk management practices and the painful experience associated with the financial crisis of 2007-2008 would lead one to expect that companies have profoundly reallocated risk management resources among various risk categories.

This study draws on construal level theory (CLT) of psychological distance (Liberman and Trope 1998; Trope and Liberman 2003; Trope et al. 2007) in order to investigate how spatial distance from a risk assessment target and risk category influences decision-makers' assessment of the probability that the risk will materialize. CLT explains how psychological distance affects decision-makers' predictions and evaluations (Trope et al. 2007). According to CLT, both spatial distance and hypotheticality constitute dimensions of psychological distance; distancing a situation along either of these dimensions results in higher level construal of the situation (Trope et al. 2007; Liberman et al. 2007a; Liberman and Trope 2008). Furthermore, CLT posits that low-probability scenarios - which are psychologically distant on the hypotheticality dimension - are cognitively associated with remote locations and high-probability scenarios are cognitively associated with proximate locations (Liberman and Trope 2008; Wakslak 2012). Based on CLT, it is expected that decision-makers will predict that a low-probability risk will materialize at a

distant location (i.e., at a remote risk target) and a high-probability risk will materialize at a proximate location (i.e. at a proximate risk target).<sup>24</sup>

To test those predictions an experiment involving 80 first-year M.B.A. students is conducted. The experiment asks participants to predict whether a highly likely risk or a highly unlikely risk, depending on experimental condition, is going to materialize at a proximate or remote location. Contrary to expectations, the results from Experiment 1 do not suggest that individuals intuitively associate the occurrence of low-probability risks with distant locations and the occurrence of high-probability risks with proximate locations. While the results from Experiment 1 fail to support the basic association between probability and spatial distance<sup>25</sup>, the findings are silent with respect to professional decision-makers' specific probability judgment concerning various risk factors when spatial distance from the risk assessment target is given. A second experiment that more directly addresses the research question was conducted.

Given that prior CLT research (see Wakslak and Trope 2009) also shows that prompting higher-level mental representations or construals (e.g., through distancing a scenario on either psychological distance dimension) leads individuals to lower their assessment of the scenario's probability, it is expected that decision-makers who evaluate a spatially remote risk target will assess the probability that various risk factors will materialize to be lower than those who evaluate a spatially proximate risk target. Furthermore, risk factors may themselves be construed at a higher (i.e., more abstract) or lower (i.e., more concrete) level, based on the manner in which they are portrayed. According to CLT (e.g., Liberman et al. 2002), narrow, more specific

---

<sup>24</sup> Throughout this text, the term "risk target" is used to refer to any object that is evaluated with respect to the risks it faces. For example, when considering the risk of fire at a warehouse location, the warehouse would be referred to as a proximate or remote risk target, depending on spatial distance from the decision-maker.

<sup>25</sup> A possible explanation for this unexpected finding is that the requested judgment may have resided outside the first-year M.B.A. participants' area of expertise and thus outside their routine cognition.

descriptions should lead to lower level construal than broader, less specific descriptions. While lower level (or concrete) risk descriptions seem to be associated with the risk category ‘operational risks’, higher level (or abstract) risk descriptions appear to be associated with the risk category ‘non-operational risks’ (that is, strategic or macroeconomic risk factors). Accordingly, it is predicted that decision-makers attribute a higher occurrence probability to operational risk factors than to non-operational risk factors. Lastly, an interaction between risk category and spatial distance of the risk assessment target is expected since Maglio et al. (2013) suggest that distancing on one dimension (e.g., spatial distance) will lead to decreasing marginal sensitivity to further distancing on a second dimension (e.g., hypotheticality). Accordingly, the effect of risk category on construal level should be lower when decision-makers evaluate a spatially remote target than when they evaluate a spatially proximate target. Thus, decision-makers should provide lowest probability estimates when assessing a non-operational risk factor for a spatially remote risk target.

To test those predictions, a  $2 \times 2$  between-subjects experiment involving 161 risk managers is conducted. The two independent variables are *spatial distance* (proximate vs. remote) and *risk category* (operational risk vs. non-operational risk). The dependent variable is an average score of the participants’ *probability assessment* concerning the occurrence of five critical risk factors (either operational or non-operational, depending on the experimental condition) identified by a recent survey conducted by Protiviti Inc. and North Carolina State University’s ERM Initiative (see Protiviti 2014a).

As anticipated, results show that risk managers who evaluate a spatially remote risk target judge the probability that various risk factors will materialize to be lower than their counterparts who evaluate a spatially proximate risk target. While no support is found for the prediction that

risk managers perceive operational risk factors as more likely to occur than non-operational risk factors, results confirm the hypothesized interaction between spatial distance and risk category. Risk managers judge the probability that a risk will materialize to be lowest when assessing a remote risk target and the risk factor is non-operational. Additional analyses reveal that the predicted main effect for risk category holds only when strategic risks (i.e., a subcategory of non-operational risk factors) are considered. Together, the findings offer preliminary evidence that professional decision-makers' risk probability judgments are systematically affected by spatial distance from the risk assessment target and that the interaction between spatial distance effects and the effects stemming from risk category prompts decision-makers to provide lowest probability assessments when estimating the likelihood that non-operational risk factors will materialize at spatially remote locations.

This research addresses the dearth of research exploring the underlying cognitive processes associated with judgment and decision-making related to risk assessment within an ERM context. Through a focus on psychological factors affecting the probability assessment step within the risk assessment process described by COSO 2004, the present study makes several important contributions. First, this research contributes to the corporate governance literature by identifying psychological distance as a potential source for judgment bias during the corporate risk assessment process. As such, this research adds to the list of potential biases identified in a recent COSO-commissioned research study by KPMG LLP which alerts board members to various judgment traps such as confirmation bias, framing, and anchoring effects (KPMG 2012).

Second, this research has practical implications that are of interest to corporate staff that develop risk registers or centralized risk databases and to designers of risk management software or similar decision aids. By identifying the *abstractness* associated with various risk categories

as a factor that influences probability assessment, the study cautions developers of (or contributors to) risk registers to consider the psychological distance implications associated with the description of various risk factors. Accordingly, the present study responds to Jordan et al.'s (2013) call for research on risk registers and addresses Ballou et al.'s (2011) concern about the lack of knowledge about the risk category - risk assessment relationship. Lastly, this research contributes to the psychology literature by addressing calls for research that investigates the impact of spatial distance on decision-makers' judgment in a highly applicable, real-world setting (see Henderson et al. 2011). Such research is important as prior accounting literature suggests that certain characteristics of the professional decision-making context may warrant adaptation to otherwise established theoretical models (see Trotman and Wright 2000).

The remainder of this chapter is structured as follows: The next section provides background information on ERM and reviews the related literature. The third section provides theoretical foundations and develops the hypotheses. Sections IV and V discuss Experiments 1 and 2, along with expected results, respectively. The last section draws conclusions, addresses some limitations, and offers directions for future research.

### Background

Ineffective risk management, which arguably led to the economic meltdown of 2007-2008, had far-reaching consequences for risk management practice and board-level risk oversight. Recent literature on ERM (e.g., Beasley et al. 2010; Ballou et al. 2011; McShane et al. 2011; Gates et al. 2012; Mikes and Kaplan 2014) points to U.S. Securities and Exchange Commission (SEC) requirements to describe board of directors' risk management oversight involvement, to various stock exchange requirements for risk management governance, and to

credit-rating agencies' decision to include risk management practices into their credit evaluation process. COSO 1992 *Internal Control – Integrated Framework* (hereafter: COSO 1992) provides a solid foundation upon which effective risk management practices can be built. Given that both the AICPA (AICPA 2006) and the PCAOB (PCAOB 2007) reference this framework as an adequate tool for management and auditors to discharge their respective responsibilities, it is not surprising that COSO 1992 quickly gained dominance among internal control frameworks (Janvrin et al. 2012) with 65% of public companies reporting the adoption of the framework as of 2010 (Beasley et al. 2010). In May 2013, COSO released an updated framework – 2013 *Internal Control – Integrated Framework* - which was designed and drafted by PwC under guidance from the COSO board. Unlike the 1992 framework, the 2013 version presents 17 principles which reflect basic concepts related to the five internal control components (control environment, risk assessment, control activities, information & communication, and monitoring activities – that is, the rows of the original 1992 COSO cube). Furthermore, so-called 'points of focus' support each of the 17 principles (77 in total) in order to provide more concrete guidance to management. Another noteworthy change is that the new framework considers four different types of reporting: internal financial reporting, internal non-financial reporting, external financial reporting, and external non-financial reporting. COSO 2013 superseded the 1992 framework on December 15, 2014 (Protiviti 2014b).

Compared to internal control, ERM is broader in scope and attends more directly to risk. Accordingly, internal control can be considered an integral part of ERM, which itself is a component of an organization's overall governance process (Chambers 2012; Protiviti 2014b). Arena et al. (2010) explain that ERM aims to connect risk management with corporate strategy and goal-setting, thereby influencing corporate control, accountability and the decision-making

process. Importantly, the conceptualization of ERM incorporates non-quantifiable risks (e.g., reputational or environmental risks) which are increasingly considered worthy of monitoring and risk management efforts. Landmark developments in corporate governance such as the reports issued by the Treadway Commission (*Enterprise Risk Management – Integrated Framework*) (COSO 2004) and the Turnbull Committee (ICAEW 1999) promote ERM as a framework for identifying critical risks from a perspective that stresses the attainment of a company's strategic goals (Mikes 2009).<sup>26</sup>

With growing interest in corporate governance and board of directors' heightened attention to risk management practices, organizational routines are progressively structured around risk. Risk management practices, which are ever more linked to the domain of management accounting, include the identification, assessment, treatment, and monitoring of risk along with gauging the effectiveness of managerial risk-control procedures (Soin and Collier 2013). Another driving force for increased risk awareness and larger scale implementation of risk-focused organizational practices is the movement toward global government regulation via risk-based regulation that stresses improved internal control processes (Soin and Collier 2013). As a result of those developments, the traditional compartmentalization of risk management (e.g., risk silos concerned with insurance or credit management) and its narrow management by the accounting and finance functions (e.g., focus on disclosures; use of derivative instruments) gave way to a more holistic appreciation of risk as evidenced in the move to ERM (Beasley and Frigo 2007; Frigo and Anderson 2011; Soin and Collier 2013).

---

<sup>26</sup> In contrast to the Turnbull framework which basically equates internal control with risk management, COSO 2004 regards the internal control framework as a component of ERM (Fraser and Henry 2007). For a comparison of COSO 2004 and ISO 31000:2009 (another highly regarded ERM framework issued by the International Organization for Standardization) see Frigo and Anderson (2014).

Recent academic literature on ERM includes archival studies, field-based case research, and a variety of survey studies. Archival ERM studies focus predominantly on performance aspects of ERM systems. Among the first such studies are Gordon et al. (2009) who developed an index of ERM effectiveness with respect to an entity's capability to attain its strategic, operational, reporting, and compliance objectives. The authors identify five contextual factors (environmental uncertainty, industry competition, firm size, firm complexity, and monitoring of the firm by its board of directors) that are positively related to the need for an ERM system. The authors conclude that superior matching between the identified contingency factors and ERM implementation distinguishes better performing organizations from their worse performing counterparts. Other studies investigate the relationship between ERM (or its quality) and firm value. For example, Hoyt and Liebenberg (2011) show that Tobin's Q is positively related to the presence of an ERM program. However, those authors do not distinguish between various levels of ERM quality. This shortcoming is addressed by McShane et al. (2011) who use Standard and Poor's (S&P) five ERM rating categories (Standard & Poor's 2006) as a proxy for ERM quality. McShane et al. (2011), who do not control for endogeneity, find that ERM rating and firm value (measured by Tobin's Q) are only positively related to rating increases spanning the domain of traditional risk management practices but not over the two top categories representing the - subjectively defined - realm of ERM. However, Baxter et al. (2013) who overcome the limitations associated with a lack of control for endogeneity (as in McShane et al. 2011) and narrow sample selection (as in Hoyt and Liebenberg 2011) report strong benefits associated with high quality ERM. The authors who also use S&P's ERM ratings to investigate the relationship between ERM quality and various firm characteristics and performance measures find that investing in high quality ERM is rewarded with better accounting returns and market valuation



measured by Tobin's Q. In addition, Baxter et al. (2013) find that larger organizations have higher quality ERM programs; that riskier organizations have inferior quality ERM programs; and that higher quality ERM is related with improved corporate governance. Those latter findings are in line with other studies that explore the benefits associated with ERM implementation from a perspective that is less focused on financial results and firm value. For example, Ballou and Heitger (2008) argue that the integration of corporate governance, ERM, and business reporting is critical for the attainment of strategic objectives and for transparent communication with various stakeholders on progress in the domain of risk management. Improved risk-communication as a result of ERM adoption is also documented by Gates et al. (2012) who further show that ERM promotes management consensus, better decision-making, and enhanced accountability. Finally, Arnold et al. (2011) suggest that high quality ERM processes strengthen an organization's ability to adapt to new regulatory requirements, in part through the strategic ERM processes' positive impact on organizational flexibility and IT compatibility.

A subset of the above discussed literature stream concerned with performance aspects of ERM explores the importance of ERM in the context of extended enterprise environments. This literature stream consists mostly of survey studies (e.g., Sutton et al. 2008; Arnold et al. 2010, 2011, and 2012) and addresses concerns raised by Power (2009) who provides a more critical review of contemporary ERM practice by arguing that insufficient consideration is given to the interconnectedness of commercial reality (i.e., outsourcing; strategic alliances). Sutton (2006), who reviews early research on risks associated with interorganizational relationships draws attention to the limitations of outdated 'enterprise-centric' perspectives and calls for the advancement of enhanced risk assessment models which accommodate an extended-enterprise

risk management perspective. A critical first step towards the improvement of risk assessment is provided by Sutton et al. (2008) who identify 49 critical risk factors for the evaluation of the effect of B2B e-commerce on an organization's overall enterprise risk. The identified risk factors (comprised of technical, application-user, and business risks) were subsequently used in surveys by Arnold et al. (2010) and Arnold et al. (2011). While Arnold et al. (2010) find that the outcome of the risk assessment process critically influences global supply chain partners' commitment towards the partnership and their willingness to share relevant information, Arnold et al. (2011) find that B2B e-commerce risk is strongly related to the desirability to obtain B2B e-commerce assurance over the trading partner. Relatedly and consistent with Power's (2007) finding that ERM procedures establish a government-independent global governance structure, Arnold et al. (2012) find that ERM strength is positively related to supply chain partner absorptive capacity and negatively related to B2B risk and associated global business risk. Business risk reduction is also the focus of a multiple case study by Foerstl et al. (2010). In the context of supply-chain relationships, the authors identify sustainable supplier management competencies as a source of competitive advantage and point to supplier risk assessment in terms of profit impact and likelihood of occurrence as a critical step towards an effective risk mitigation response. Lastly, Raiborn et al. (2009) highlight the importance of including support service outsourcing risk assessment into an organization's ERM efforts as an important step toward increasing the chances of success associated with such interorganizational relationships.

A second major literature stream is concerned with organizational characteristics related to the degree of ERM adoption and ERM implementation differences among various organizations. Concerning organizational characteristics, Beasley et al.'s (2005) survey provides initial evidence that the degree of ERM implementation is heavily influenced by senior executive

and board of director leadership with respect to ERM deployment. Other critical factors identified include entity size, industry, country of domicile, and type of auditor used by the organization. Intriguing insights into the way ERM is implemented and adopted by various organizations is offered by a series of case studies. Mikes (2009) provides field-based evidence that systematic differences exist in ERM practices. Based on her investigation of banking organizations, she identifies *ERM by the numbers* and *holistic ERM* as two distinct styles of ERM models, each being the result of a different ‘calculative culture’. In a follow-up discussion of her field research, Mikes (2011) concludes that Power’s (2009) concern with dysfunctional, all-encompassing risk management may only apply to organizations whose ‘calculative culture’ is reflective of ‘quantitative enthusiasm’ (i.e. allowing metrics to dominate judgment) rather than of ‘quantitative skepticism’ (i.e., the envisioning of alternative futures) (see also Kaplan et al. 2009). Evidence from a broader selection of organizations who have adopted ERM is provided by Arena et al. (2010). Through a longitudinal case-study involving multiple companies, Arena et al. (2010) illustrate the dynamic nature of ERM and conclude that the combined influence of various risk rationalities, risk experts, and risk technologies not only affect how ERM is initially implemented, but also how it evolves over time as it confronts pre-existing practices (Arena et al. 2010).

In addition to the above discussed major ERM research streams, a mixture of academic and professional surveys shed valuable insights into specific ERM practices and top executives’ perceptions associated with those processes. For example, a recent survey by Ballou et al. (2011) reveals that board members may have insufficient information about actual ERM processes – including the estimation of risk probability and their potential impact. This seems troublesome since it has been suggested that the estimation of risk probability and impact constitutes an

integral part of strategic ERM (see Arnold et al. 2011; Collier 2009). Moreover, board members seem to receive risk information that is excessively focused on operational and compliance risks and insufficiently focused on strategic and emerging risks. Over half of their respondents indicated that “more information about emerging risks, risk impact, risk response, or risk likelihood would be very or extremely beneficial” (Ballou et al. 2011; p. 21). The authors conclude that the low probability of various emerging risks may prevent those risks from gaining board attention. In support of this argument, PwC’s 2013 Annual Corporate Directors Survey (PwC 2013b) reports that 57 percent of corporate directors indicated that their board has only a moderately adequate understanding of emerging risks that may impact their company. Even more discouraging are results from a COSO-sponsored survey by Beasley et al. (2010) which indicate that more than 40% of organizations either entirely lack formal procedures for the identification and monitoring of emerging strategic risks or have only minimal processes in place. Those findings are particularly worrisome since an earlier study by PwC (PwC 2009) cites estimates according to which 60% of risks capable of inducing a rapid decline in shareholder value (defined as a 50% decline within a 12-month period) are strategic in nature.

Overall, the above reported findings strongly suggest that corporate boards may value additional insights into organizational risk identification practices and factors influencing the associated assessment of risks in terms of probability of occurrence and estimated impact. To address some of those concerns, the present study applies insights from recent advancements in psychology to the domain of probability judgments in ERM environments. As such, this exploratory study strives to open the ‘black box’ representing the probability assessment

component within the risk assessment process outlined by COSO 2004.<sup>27</sup> COSO 2004 depicts risk assessment as a four-step process which links risk identification and risk response (see Figure 1). Risk identification may be facilitated through the use of risk registers or centralized risk databases (Fraser and Henry 2007; Mikes 2009; Mikes and Kaplan 2014). Once risks are identified, their assessment criteria are determined. Impact and likelihood (i.e. the probability that a certain event will occur) represent conventional assessment criteria within the framework although additional criteria (e.g., velocity of impact) may also be used. The criteria for impact evaluation include operational, financial, reputational, regulatory, security, safety, health, environmental, customer, and employee effects. Concerning the likelihood criteria, assessments may be communicated through qualitative terms (e.g., frequent, likely, possible, unlikely, rare), through a probability percentage, or through specification of a frequency (COSO 2004).

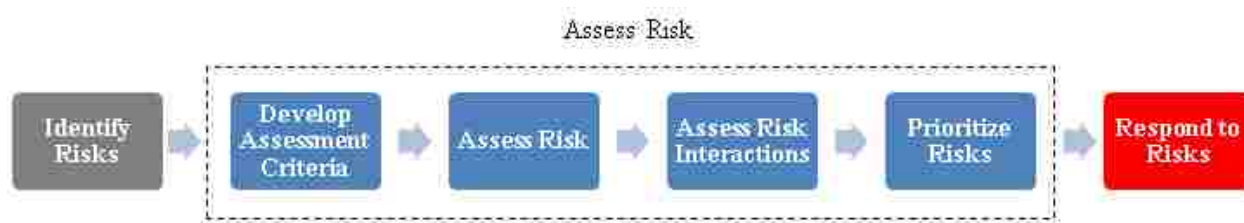


Figure 10: Risk Assessment Process

*Adopted from COSO, Enterprise Risk Management – Integrated Framework (2004).*

The outcome of the assessment of risk factors with respect to those criteria is frequently depicted on so-called ‘risk maps’ or ‘heat maps’, which according to Jordan et al. (2013), constitute a particularly popular risk visualization technology espoused by COSO guidelines as a means for setting risk appetite (see also Mikes 2009; Mikes and Kaplan 2014). An illustrative risk map is depicted in Figure 11. The following section discusses recent developments in

<sup>27</sup> While the present research references COSO 2004, other ERM frameworks prescribe procedures for risk assessment that are in essence equivalent to those of the COSO 2004 framework (see Ballou and Heitger 2008).

psychology theory which provide valuable insights into the above discussed risk assessment process.

**Impact**

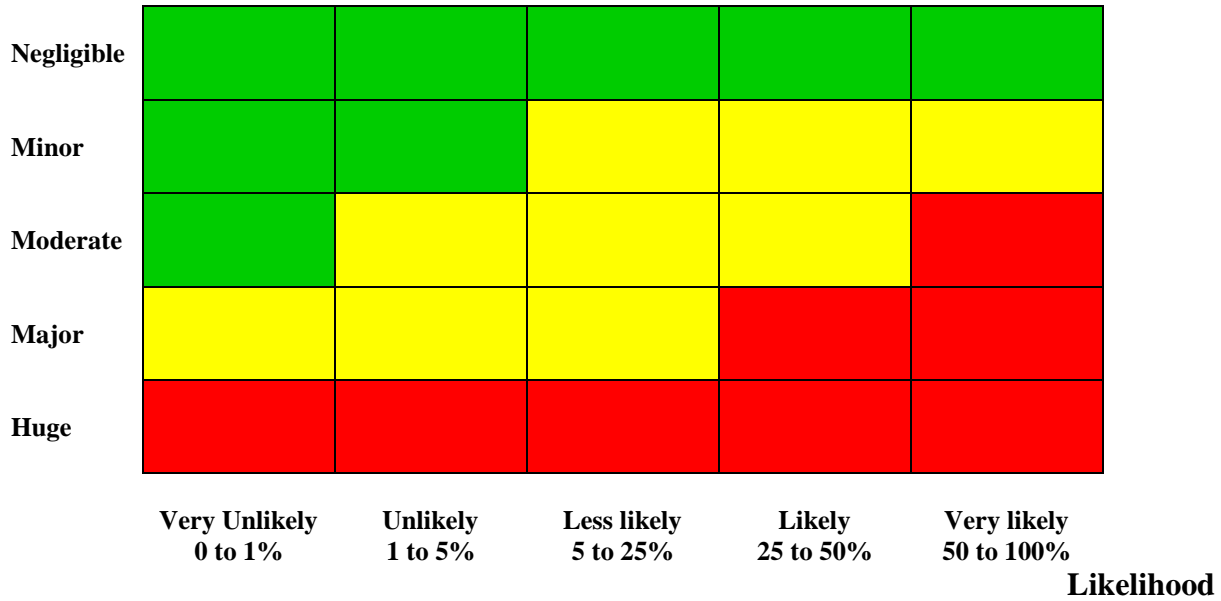


Figure 11: Illustrative Risk Map

*Adopted from Jordan et al. (2013) (actual monthly report).*

Theory and Hypotheses

This research draws on CLT (Liberman and Trope 1998; Trope and Liberman 2003; Trope et al. 2007) in order to investigate how spatial distance from a risk assessment target and the nature of the risk under consideration (i.e., risk category) affects decision-makers’ assessment of the probability that the risk will materialize. CLT is a theory of how psychological distance affects individuals’ cognition and behavior (Trope et al. 2007). The theory highlights the importance of mental construal (i.e., mental representation) for judgment and decision-making and introduces the level of abstraction as a distinguishing characteristic of mental

representation (Fujita and Han 2009). A central insight from CLT is that the level of mental construal is intimately linked to psychological distance in a bidirectional relationship (Bar-Anan et al. 2006; Liberman et al. 2007a, 2007b; Trope et al. 2007; Liberman and Trope 2008; Trope and Liberman 2010): objects or events that are psychologically farther removed from the *here* and *now* (i.e., the egocentric reference point representing zero distance), invoke higher level construal and higher-level construal prompts thoughts of more distant objects or events (Liberman et al. 2007a, 2007b; Liberman and Trope 2008; Trope and Liberman 2010). The close connection between construal level and psychological distance is presumed to be caused by differential knowledge about proximal and distal entities. That is, the farther an entity is removed from the *here* and *now*, the less reliable information is typically available, causing individuals to form more abstract (schematic) mental representations of the entity. CLT research finds that an overgeneralization of the aforementioned association causes construal level to be affected by psychological distance even in the presence of equivalent information about near and distant situations (Trope and Liberman 2003; Liberman et al. 2007a, 2007b; Trope et al. 2007).

Liberman and Trope's (1998) seminal article explains that high-level construals of an event or situation are relatively abstract and stress superordinate, decontextualized, and global features that are rather invariant. Low-level construals, on the other hand, are more concrete, and highlight contextualized and subordinate aspects. This distinction between abstract and concrete construals is critical as CLT further proposes that construal level systematically affects prediction, evaluation, and behavior (Trope et al. 2007; Liberman et al. 2007a; Liberman and Trope 2008).

Trope and Liberman (2010, p. 442) explain psychological distance as referring "to the perception of *when* an event occurs, *where* it occurs, to *whom* it occurs, and *whether* it occurs".

Accordingly, psychological distance as conceptualized by CLT includes temporal distance, spatial distance, social distance, and hypotheticality (Trope et al. 2007; Liberman et al. 2007a; Liberman and Trope 2008; Trope and Liberman 2010). With respect to the fourth dimension of psychological distance, Wakslak (2012) explains that hypotheticality is intimately related to the concept of likelihood (i.e. probability) as the latter represents a continuum which joins certainty and hypotheticality. That is, the higher an event's probability is, the more it belongs to the realm of certainty and the more proximate it appears (Wakslak 2012). Hypotheticality and spatial distance are the two dimensions of psychological distance that are of particular relevance to the present study.

One of the first studies to investigate the effects of spatial distance is Fujita et al. (2006a) who explore how the interpretation of a social event varies depending on whether the event is thought to happen at a spatially proximate or remote location. The authors hypothesize and find that describing a social event as occurring at a remote location will cause individuals to construe the event in more abstract terms. Participants indicated a preference for identification of behavior as *ends* when they thought of the behavior as occurring at a distant location and as *means to an end* when they thought of the behavior as occurring at a nearby location. Furthermore, participants described purportedly distant [proximate] actions in more abstract [concrete] terms. In a follow-up study within the context of social events, Henderson et al. (2006) theorize and find that raising the reported spatial distance of an event elevates the effect of high-level features (e.g., global trends; personality traits) and lowers the effect of low-level features (e.g., unusual results; context-specific task characteristics) on social judgments, evaluations, and preferences. Results from four experiments indicate that participants categorized continuous actions into fewer, more encompassing segments and that they were more likely to ascribe behavior to



dispositional characteristics of the actor (greater correspondence bias) when evaluating spatially remote rather than proximate behavior. In addition, prototypical [atypical] events were more [less] probable for spatially more remote locations. Participants also displayed less inclination to extrapolate from outlier data when rendering forecasts about spatially remote events.

Two unrelated studies identify beneficial behavioral effects associated with increased spatial distance. Jia et al. (2009) propose that a simple cue such as the origin of an assignment can prompt higher-level construal and thereby more abstract cognition which leads to more creative problem solving. Results from two experiments show that subjects (a) offered more creative answers when they were informed that the creativity task was developed at a remote location compared to a more proximate location, and (b) demonstrated superior performance on problem solving assignments that called for creative insights. Henderson (2011) investigates whether increased spatial distance between negotiators promotes more integrative negotiation outcomes (i.e. logrolling agreements). The author proposes that greater spatial distance should lead negotiators to construe their actions in terms of higher-level motivations, thus facilitating the maintenance of proper priorities and ultimately the achievement of mutually beneficial outcomes due to more adequate tradeoffs across high and low-importance issues. Two experiments in which negotiators believed to be either spatially close or spatially distant from their negotiation partner confirm that greater perceived spatial distance leads to more Pareto-efficient outcomes.

This research as well as two recent literature reviews concerned exclusively with the spatial distance dimension of psychological distance underscore the profound impact of spatial distance on construal, prediction, judgment, and behavior (see Henderson and Wakslak 2010 and Henderson et al. 2011). Not surprisingly, Henderson and Wakslak (2010) conclude that spatial

distance may affect representation, judgment, and behavior to an even larger degree than other manifestations of psychological distance.

Research on the hypotheticality dimension of psychological distance has recently drawn increased attention among CLT scholars. Wakslak et al. (2006), for example, show how a focus on either low- or high probability events affects individuals' behavior and preferences. More specifically, the authors propose an inverse relationship between probability and construal level, arguing that events which may have happened or those which are merely plausible are perceived as more distant from one's direct experience (i.e., the *egocentric reference point*) than events that actually happened or those that are sure to happen. The authors further argue that this association holds even in situations in which individuals have equal knowledge about low-probability and high-probability events. Based on this reasoning, low-probability events should draw attention to the events' abstract, superordinate, global aspects (high-level construal) while high-probability events should prompt individuals to focus on the detail-level, specific, and subordinate aspects (low-level construal) of the event (Wakslak et al. 2006). Results from six experiments show that participants who are urged to think about an event as unlikely to occur (compared to participants who are prompted to think about an event as likely to occur) opt for broader, more inclusive object categorizations; indicate greater preference for broad rather than specific description of an activity; segment action into fewer parts; are more effective in a task requiring the abstraction of visual information; and are less successful in a task requiring the detection of details missing from coherent pictures. Results from a seventh study indicate that participants who are semantically primed with low probability phrases (compared to participants who are semantically primed with high probability phrases) prefer to categorize behaviors in ends-related terms rather than in means-related terms, thus indicating a more abstract processing orientation

during the action identification task (Wakslak et al. 2006). The impact of probability on preferences via level of construal is also investigated by Todorov et al. (2007) who find that desirability concerns are more influential than feasibility concerns when the probability of an outcome is low and that this preference may reverse as outcome probability rises. The authors explain their findings with reference to the CLT prediction that the importance of means-related aspects (i.e., low-level features) *relative* to the importance of ends-related aspects (i.e., high-level features) escalates as probability rises and on Sagristano et al.'s (2002) finding that desirability and feasibility concerns are asymmetrically weighted in judgments (Todorov et al. 2007). Together, Wakslak et al.'s (2006) and Todorov et al.'s (2007) results provide converging evidence for the hypothesized inverse relationship between probability and construal level from a directional perspective that emphasizes how probability affects preferences (and behavior) via impact of construal level.

Investigating the opposite direction of causality, Wakslak and Trope (2009), propose that general mindset orientation (that is, the degree of abstract thinking as affected by construal level) influences probability judgments. More specifically, the authors propose that prompting high-level construal will lead individuals to focus on the improbability of a given event, thereby lowering their assessment of the event's probability. This reasoning parallels Liberman and Trope (2008) who contend that "...activating high-level construals should lead people to think of events in psychologically more distant situations" (p. 1204). Results from five studies which employed a series of diverse and even task-unrelated mindset manipulations confirm the hypothesized relationship.

Of particular importance to the present inquiry is a study by Wakslak (2012) which examines the relationship between probability and two other dimensions of psychological

distance - spatial distance and temporal distance. The author posits that individuals relate probability to the aforementioned distance dimensions and consequently anticipate that less [more] likely events happen at remote [proximate] locations and in the distant [near] future. This reasoning is in line with Liberman and Trope (2008) who argue that “remote locations should bring to mind the distant rather than the near future, other people rather than oneself, and unlikely rather than likely events” (p. 1202). Wakslak’s (2012) argumentation also builds on the results from Wakslak et al. (2006), Wakslak and Trope (2009), and Todorov et al. (2007) as those studies find evidence of an inverse relationship between probability and level of construal which, in turn, is affected by distancing on either of the psychological distance dimensions. Results from Wakslak’s (2012) three studies confirm her predictions and demonstrate that the hypothesized relationship holds irrespective of whether the low probability outcome is representative of a neutral, positive, or negative situation.

Together, the above discussed CLT literature suggests that both spatial distance and hypotheticality are dimensions of psychological distance with the consequence that distancing a situation along either of those dimensions not only prompts a higher level construal of the situation (i.e., more abstract processing), but also affects its evaluation (Trope et al. 2007; Liberman et al. 2007a; Liberman and Trope 2008). Given that low-probability events are farther removed from certainty than high-probability events, the former represent more hypothetical situations and are thus *more* distanced on the hypotheticality dimension of psychological distance (Wakslak et al. 2006; Wakslak 2012). Accordingly, proper matching of distance dimensions suggests an inverse relationship between probability and spatial distance such that low-probability situations are perceived to be associated with distant locations and high-probability situations are perceived to be associated with proximate locations (Liberman and

Trope 2008; Wakslak 2012).<sup>28</sup> Consequently, it is predicted that decision-makers will predict that a low-probability risk will materialize at a distant location and a high-probability risk will materialize at a proximate location. Formally stated:

*H1a: Decision-makers will predict that a low-probability risk will materialize at a remote rather than a proximate location.*

*H1b: Decision-makers will predict that a high-probability risk will materialize at a proximate rather than a remote location.*

Furthermore, given that spatially more distant events are construed at a higher level (Liberman et al. 2007a , 2007b; Liberman and Trope 2008; Trope and Liberman 2010) and that prompting higher-level construal leads individuals to lower their assessment of the event's probability (Wakslak and Trope 2009), it is predicted that decision-makers who evaluate a spatially remote risk target should assess the probability that various risk factors will materialize to be lower than decision-makers who evaluate a spatially proximate risk target.

*H1c: Decision-makers who evaluate a spatially remote target will assign a lower probability to the occurrence of various risk factors than decision-makers who evaluate a spatially proximate target.*

Given that risks represent hypothetical events which may themselves be construed more or less abstractly prompts two related questions: First, does the construal of risks affect their subjective probability assessment? Second, how does the construal of risks interact with other distance dimensions – in this case spatial distance from the risk assessment target? Liberman et al. (2007a) who suggest that individuals infer realism from construal level offer a response to the

---

<sup>28</sup> See Bar-Anan et al. 2006 for a discussion of the association among distance dimensions and Zhao and Xie 2011 for a discussion of the 'fit' among various distance dimensions.

first question by stating that “A low-level construal of hypothetical events, more than a high-level construal, makes them seem more likely to become real, or, in other words, makes them seem more probable” (p. 361). In the context of risk management, risk factors that are construed at a lower level may thus appear more proximate (i.e., real) and accordingly be attributed a higher level of probability of occurrence. Accordingly, risks that are described with greater specificity (e.g., succession challenges) should be construed at a lower level than those described in more vague terms (e.g., an unexpected crisis). This line of argumentation is closely related to the concept of categorization. Liberman et al. (2002) explain that “abstract categories (e.g., food) are more inclusive than concrete, subordinate categories (e.g., snacks)” (p. 525) and show that participants categorize objects into more abstract categories when those objects related to distant future situations. Similar results are reported by Fujita et al. (2006a) in the context of spatial distance (preference for abstraction with respect to action taking place at a distance) and by Smith and Trope (2006) in the context of social distance (power-primed individuals construed information more abstractly). Given the similarity among distance dimensions with respect to prediction, evaluation, and behavior (Liberman et al. 2007a; Trope et al. 2007; Liberman and Trope 2008; Trope and Liberman 2010) and the bidirectional relationship between psychological distance and level of construal, thinking about abstract categories should facilitate attribution of those categories to events of lower probability (i.e., events that are distant on the hypotheticality dimension). In the context of risk assessment, risks may be described with reference to broader risk categories such as *adverse economic conditions* or more narrow risk categories such as *cyber threats*.

Lastly, with respect to references to out-groups vs. in-groups (i.e., social distance), Liberman et al. (2007a) suggest that the former are construed more abstractly due to the fact that

individuals usually have less direct experience with them. Thus, in the context of risk assessment, risk factors which indicate lower social distance (e.g., risks associated with key suppliers) between the source of the risk and the risk target should prompt lower level construal than risk factors which indicate higher social distance (e.g., entrance of new competitors).

Risk factors in the domain of operational risks fit the characteristics of risk factors that are construed at a lower level (more specific; socially closer; narrower category) to a greater extent than non-operational (e.g., macroeconomic or strategic) risk factors. In other words, the category of non-operational risk factors contains (in general) more abstract risk descriptions than the category of operational risk factors. This reasoning is also in line with Cantor and Macdonald (2009) who suggest that the attributes of abstract construal include *strategic concerns* whereas those of concrete construal include *operational concerns*. Accordingly, based on CLT, decision-makers should attribute a higher occurrence probability to operational risk factors than to non-operational risk factors. Formally stated:

*H2: Decision-makers will perceive operational risk factors as more likely to materialize than non-operational risk factors.*

Given the core CLT proposition that construal level and psychological distance are closely associated in a bidirectional relationship (Bar-Anan et al. 2006; Liberman et al. 2007a, 2007b; Trope et al. 2007; Liberman and Trope 2008; Trope and Liberman 2010), the effects predicted in H1c and H2 are hypothesized to interact. The most systematic investigation of the combined effects of various distances on overall psychological distance is provided by Maglio et al. (2013). The scholars combine insights from studies of subadditivity (e.g., findings that the subjective effect of a given time span fluctuates with temporal distance) and interchangeability among distance dimensions and propose that distancing on one dimension will lead to decreasing

marginal sensitivity to further distancing on a second dimension. A series of studies in which the authors use each distance dimension at least once as the initial and once as the second instantiation of distance provides converging evidence that cross-dimensional distancing leads to effects comparable to those attributed to within-dimension distancing. Maglio et al. (2013) therefore conclude that the psychophysical Weber-Fechner law holds for cross-dimensional distancing as evidenced by the fact that experiencing any form of distance lowers sensitivity to distance on a second dimension. In the context of the present study, Maglio et al.'s (2013) result imply that decision-makers who are tasked with evaluating risk factors pertaining to a remote target (i.e., the first instantiation of psychological distance) will be less sensitive to further distancing on any other dimension. This suggests that the effect of risk category on construal level (which is directly associated with psychological distance in a bidirectional relationship) is lower when decision-makers evaluate a spatially distant target than when they evaluate a spatially proximate target. Differently stated, the difference between probability estimates for a spatially proximate vs. remote risk target should be larger for operational risk factors than for non-operational risk factors (i.e., the gap in probability estimates should narrow when non-operational risk factors are considered). The predicted ordinal interaction thus implies that decision-makers should provide lowest probability estimates when assessing a non-operational risk factor for a spatially remote risk target. Formally stated:

*H3: Decision-makers will assess the probability that a risk will materialize to be lowest when assessing a remote risk target and the risk factor is non-operational.*

The expected results are depicted in Figure 12. The following sections describe the research method used to test the hypotheses. H1a and H1b are tested in Experiment 1. H1c through H3 are tested in Experiment 2.



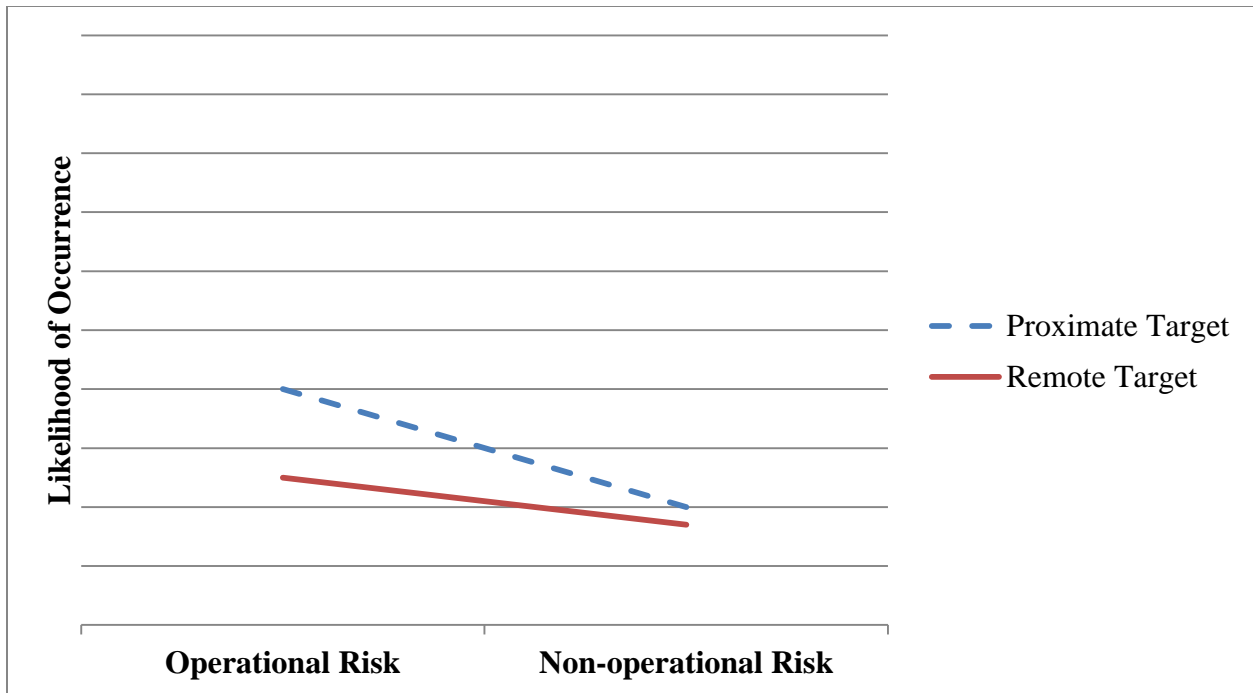


Figure 12: Expected Results - Experiment 2

### Experiment 1

Experiment 1 is designed to provide preliminary evidence that the assessment of probability is associated with spatial distance information (see also Wakslak 2012 – Study 1). As such, Experiment 1 tests hypotheses H1a and H1b which state that decision-makers will predict that a low-probability risk will materialize at a distant location and a high-probability risk will materialize at a proximate location, respectively. The experimental material for Experiment 1 contains a case scenario followed by a forced-choice dependent variable measure, manipulation check questions, a debriefing question, and a biographic questionnaire. Appendix C illustrates the experimental material.

## Participants

Eighty first-year M.B.A. students participated in the experiment. The controlled experiment was conducted in paper-and-pencil form during regular class time. Experimental instruments were randomized and distributed by the researcher in the presence of the instructor. Students received five extra credit points toward their first mid-term examination as compensation for their voluntary participation. Participants' mean age was 31.1 years and mean years of work experience was 9.9 years. The sample consists of 46 male (57.5%) and 34 female (42.5%) participants. With respect to the M.B.A. students' intention to work in accounting, finance, or risk management upon graduation, 37 participants (46.3%) answered "Yes", 34 (42.4%) answered "No", and the remaining 9 participants (11.3%) answered "Don't know". There are no significant differences with respect to any of the demographic measures (age, gender; work experience; years lived in Orlando; and intention to work in accounting, finance or risk management upon graduation) across experimental conditions, (all p-values > 0.26). Demographic information is presented in Table 18.

Table 18: Demographics - Experiment 1

---

		<b>(N = 80)</b>	
<b>Age</b>			
Mean		31.1	
Median		28.5	
Minimum		22.0	
Maximum		68.0	
Standard Deviation		7.7	
<b>Years of work experience</b>			
Mean		9.9	
Median		8.0	
Minimum		0.0	
Maximum		40.0	
Standard Deviation		7.6	
<b>Years lived in Orlando<sup>a</sup></b>			
Mean		15.0	
Median		12.0	
Minimum		1.0	
Maximum		57.0	
Standard Deviation		11.2	
		<b><u>Number</u></b>	<b><u>Percent</u></b>
<b>Gender</b>			
Male		46	57.5%
Female		34	42.5%
<b>Intention to work in accounting, finance, or risk management upon graduation</b>			
Yes		37	46.3%
No		34	42.4%
Don't know		9	11.3%

---

<sup>a</sup> One participant failed to provide the requested information. Data is thus based on n = 79

## Experimental Procedures

The experiment presents participants with a scenario describing a hypothetical company (ABC Company; ABC) located in Orlando, FL. The company has recently established two additional subsidiaries, one located Lake Mary, FL and one in Minneapolis, MN. Both subsidiaries specialize in different, but equally profitable product lines. Participants are asked to assume the role of a team leader in charge of risk management for ABC. The risk management team is in the early stages of developing a formal risk management process for ABC's subsidiaries and, as part of this process, needs to consider the occurrence of various critical risks. Participants are informed that their team ranks risk factors into five categories based on the likelihood of occurrence and are presented with a corresponding scale adopted from a COSO-commissioned risk assessment practice guide developed by Deloitte & Touche LLP (Deloitte 2012). Next, participants are informed that “one of the risks under consideration is the risk that a massive cyber-attack leads to a prolonged interruption of a subsidiary's order processing capabilities” and that “another risk under consideration is the risk that a key supplier will be unable to meet a subsidiary's demand for supplies for a prolonged period of time.” Participants are further informed that (a) “based on [their] teams' analysis, the probability that such a cyber-attack will target either subsidiary at some point during their respective project-lifetime is **less than 5%**” and that their team has classified this risk as “rare” based on the aforementioned categorization frame; and (b) that “based on [their] teams' analysis, the probability that key supplier problems will occur and affect the product line of either subsidiary at some point during their respective project-lifetime is **at least 90%**” and that their team has classified this risk as “almost certain” based on the aforementioned categorization frame. The case material further

informs participants that the impact of either risk is equally severe, regardless of whether the risk materializes at the Lake Mary-based subsidiary or at the Minneapolis-based subsidiary.

Next, participants read the following passage based on Wakslak (2012): “You may feel that you do not have sufficient information to adequately respond to the following question. If this happens, do not worry - the study is concerned with your intuitive judgment”. Participants are then instructed to “Assume [that] the highly likely risk (at least 90% chance of occurrence) WILL EVENTUALLY materialize” (Condition 1) or to “Assume [that] the highly unlikely risk (less than 5% chance of occurrence) WILL EVENTUALLY materialize” (Condition 2). Following those instructions, participants in Condition 1 (Likely Risk Condition) respond to the forced-choice question “Where do you think the highly likely risk (at least 90% chance of occurrence) will materialize?” whereas participants in Condition 2 (Unlikely Risk Condition) respond to the forced-choice question “Where do you think the highly unlikely risk (less than 5% chance of occurrence will materialize?” The probabilities associated with each risk factor (i.e., 5% vs. 90%) and their associated classification (e.g., ‘rare’ vs. ‘almost certain’) was counterbalanced among participants.

### Manipulation Checks

After completing the task, participants responded to three manipulation check questions. Given the nature of the task and the research question, it is crucial that participants pay sufficient attention to the spatial distance and risk impact components of the experimental material. Accordingly, the following true/false questions were posed: (1) “The scenario you just read described that you and your risk management team are located in Orlando, FL”; (2) “The preceding scenario explained that the impact of a cyber-attack would be equally severe

regardless of which subsidiary would be affected by a cyber-attack”; and (3) “The preceding scenario explained that the impact of a key supplier problem would be equally severe regardless of which subsidiary would be affected by a key supplier problem”. Sixty-seven participants (84%) responded correctly to all three manipulation check questions while thirteen participants (16%) failed either one or two manipulation check manipulation check questions.<sup>29</sup> Eliminating participants who failed one or two manipulation check questions does not lead to a qualitative change of the results. Hence, the results reported below are based on the full sample.

### Debriefing Questions

A debriefing question asked participants to rate their prior experience with risk management practices. The five answer choices are “Highly experienced (participated in many risk management projects)”, “Experienced” (participated in several risk management projects)”, “Knowledgeable (participated in at least one risk management project)”, “Indirect experience only (e.g., read about risk management practices; worked on a student project related to risk management)”, and “No experience”. Overall, participants indicated that they had only indirect experience with risk management practices (mean = 2.15, s.d. = 1.15).<sup>30</sup> Experience with risk management practices did not vary between conditions (p-value = .440).

### Results

A chi-square test for independence of classification was used to determine whether a relationship between spatial distance of the risk assessment target and the occurrence of a low-likelihood and high-likelihood risk exists. Contrary to expectations, no significant relationship

---

<sup>29</sup> Only two participants failed two manipulation check questions.

<sup>30</sup> The mean is significantly lower than the midpoint of the scale ( $t_{79} = 6.62$ , two-tailed p-value < .001)

between the two variables of interest was detected ( $X^2 = .208$ , two-tailed p-value = .648). H1a and H1b are therefore not supported. Participants did not seem to associate the occurrence of a highly unlikely risk with a remote location and the occurrence of a highly likely risk with a proximate location. A potential explanation for this phenomenon may be that participants did not provide intuitive judgments even though the instructions to the experimental material called for intuitive decision-making. It is possible that in a professional decision-making context the predictions derived from CLT hold only in situations in which the judgment of interest falls within individuals' professional problem domain, that is, within the decision-maker's routine cognition. The requested judgment may have resided outside the first-year M.B.A. participants' area of expertise and thus outside their routine cognition. The potential lack of fit between participants' expertise and the intuitive judgment task may thus constitute a limitation of the present study which could be addressed in future research. Table 19 illustrates the results.

Table 19: Results - Experiment 1

**Test of Independence between Probability and Distance**

<b><u>Probability</u></b>		<b>Location<sup>a</sup></b>		
		<b><u>Proximate</u></b>	<b><u>Remote</u></b>	<b><u>Total</u></b>
Low (“rare”)	Count	15	25	40
	Expected Count	16	24	40
	% within Location	37.5%	62.5%	100%
High (“almost certain”)	Count	17	23	40
	Expected Count	16	24	40
	% within Location	42.5%	57.5%	100%
Total	Count	32	48	80
	Expected Count	32	48	80
	% within Location	40.0%	60.0%	100%
Chi-square (d.f. = 1)				<b>.208</b>
p-value				<b>.648</b>

<sup>a</sup> Given the participants’ location, “proximate” refers to Lake Mary, FL and “remote” refers to Minneapolis, MN.

Experiment 2

Experiment 2 constitutes the main analysis by testing hypotheses H1c, H2, and H3. H1c predicts that decision-makers who evaluate a spatially remote risk target will assess the probability that various risk factors will materialize to be lower than decision-makers who evaluate a spatially proximate risk target. H2 predicts that decision-makers will perceive operational risk factors as more likely to materialize than non-operational risk factors. Lastly, H3 predicts that decision-makers provide the lowest probability assessments when estimating the likelihood that non-operational risk factors will materialize at spatially remote locations.



To test H1c through H3, a web-based process (Qualtrics) was used to administer a 2 x 2 between-subjects experiment and to assign participants to the four experimental conditions on a random basis. The experimental design fully crosses *spatial distance* (DISTANCE) and *risk category* (CATEGORY) between subjects. The experimental material contains initial screening questions, a case scenario followed by dependent variable measures, debriefing and manipulation check questions, and a set of demographic items. Participants who failed a manipulation check question (discussed below) were exited from the survey in order to ensure that only responses from individuals who paid sufficient attention to the experimental material are used for the analyses. Participants took an average of 9.1 minutes (s.d. = 24.75) to complete the experiment (no difference across conditions: p-value = .283). Appendix D illustrates the experimental material.

### Participants

A survey company was hired to solicit participants for the experiment.<sup>31</sup> Only participants who responded “Yes” to the following three screening questions were permitted to proceed: (1) “Are you currently working for a company located within a 160 mile radius of Chicago, IL?”; (2) “Are you currently employed in a position that requires you to render decisions associated with organizational risk management?”; and (3) “Do you have at least 2 years’ experience with rendering corporate risk management decisions?” Given the critical role of spatial distance, it was important to identify participants who were able to internalize location-specific assumptions provided in the case scenario. As the case scenario calls for participants to assume that they work for a company based out of Chicago, IL, the survey company was

---

<sup>31</sup> Participants recruited from the survey company were compensated for their participation. The amount of compensation is unknown to the researcher.

instructed to identify participants who lived within a 160 mile radius of Chicago, IL. The decision to use a 160 mile radius was based on the survey company's ability to locate a sufficient number of qualified individuals.<sup>32</sup> The researcher instructed the survey company to identify participants who are "primarily responsible for managing / evaluating non-financial risks – that is, risks associated with operations, supply-chain management, and strategic risks." For further clarification, a list of potential job titles that ordinarily identify such individuals was provided to the survey company.<sup>33</sup> As no single job description captures a significant portion of the identified participants, the term *risk manager* is used to refer to the participants in Experiment 2.

A total of 161 risk managers completed the experimental material. Participants' mean age was 35.9 years and reported mean years of risk management experience and overall work experience was 7.1 and 13.2 years, respectively. The sample consists of 84 male (52.2%) and 77 female (47.8%) participants. Most participants (85.1%) indicated that they hold a manager or higher-level position within their firm. Moreover, a large portion of participants (78.9%) indicated that they hold one or more professional licenses. With respect to education, 79 participants (49.1%) declared a Bachelor's degree as the highest level of education attained, 58 participants (36.0%) a Master's degree, 15 participants (9.3%) a doctorate degree, and 9 participants (5.6%) indicated "Other". No significant differences with respect to demographic measures age, years of risk management experience, years of overall work experience, gender, position, and education exist across experimental conditions (all p-values > 0.47). A statistically

---

<sup>32</sup> Participants provided their ZIP code so that the distance between the participant's location and downtown Chicago, IL could be estimated. The average distance based on ZIP code was 25.30 miles (s.d. = 28.28). There was no significant difference in miles across conditions (p-value = .895).

<sup>33</sup> For example, Chief Risk Officer, Vice President – Risk Management, Supply Chain Risk Manager / Director, Business Continuity Manager, Director – (Enterprise) Risk Management, Enterprise Risk Management Analyst / Specialist, Risk Management Specialist, Associate / Manager / Senior Manager – Risk Management, Corporate Risk Analyst (non-financial).

significant difference between conditions exists only with respect to the number of participants who indicated that they hold no professional license (p-value = .014).<sup>34</sup> However, regression results discussed in section “Results” indicate that participant responses related to professional licenses should not be included in the analyses. Table 20 presents the demographic information.

Table 20: Demographics - Experiment 2

---

**(N = 161)**

<b>Age</b>		
Mean		35.9
Median		35.0
Minimum		20
Maximum		60
Standard Deviation		8.6
<b>Years of experience</b>	<b>Risk management</b>	<b>Overall work experience</b>
Mean	7.1	13.2
Median	6.0	10.0
Minimum <sup>a</sup>	1.0	1.0
Maximum	25.0	41.0
Standard Deviation	4.6	8.0
<b>Gender</b>	<b><u>Number</u></b>	<b><u>Percent</u></b>
Male	84	52.2%
Female	77	47.8%
<b>Position</b>		
Staff	9	5.6%
Supervisor	15	9.3%
Manager	62	38.5%
Director	49	30.4%
Partner	12	7.5%
C-level Executive	14	8.7%

---

<sup>34</sup> No statistically significant difference exists among conditions with respect to any other professional licenses (all p-values > .15).

---

	<u>Number</u>	<u>Percent</u>
<b>Highest academic degree</b>		
Bachelor's	79	49.1%
Master's	58	36.0%
Ph.D.	15	9.3%
Other	9	5.6%
<b>Professional licenses<sup>b</sup></b>		
CPA ( <i>Certified Public Accountant</i> )	42	26.1%
CIA ( <i>Certified Internal Auditor</i> )	28	17.4%
CMA ( <i>Certified Management Accountant</i> )	27	16.8%
CRISC ( <i>Certified in Risk and Information Systems Control</i> )	37	23.0%
CRMA ( <i>Certification in Risk Management Assurance</i> )	29	18.0%
FRM ( <i>Financial Risk Manager</i> )	28	17.4%
PRM ( <i>Professional Risk Manager</i> )	25	15.5%
None	34	21.1%
Other	9	5.6%

---

<sup>a</sup> Three participants indicated only 1 year of risk management experience even though the qualification criteria specified a minimum of two years' risk management experience. Eliminating those participants from the analyses does not alter the overall reported results.

<sup>b</sup> Several participants indicated that they hold more than one professional license. Totals do therefore not add up to N=161 and 100%, respectively.

### Experimental Task

Experiment 2 presents participants with a scenario describing a hypothetical company (ABC Company; ABC) located in Chicago, IL that has recently established a subsidiary called RoboSurge. According to the case material RoboSurge currently sells customized robotic surgery tools “to most of ABC’s established markets with about 40 percent of sales going to the emerging markets of India, Eastern Europe, and Brazil... [and] sources key supplies from China and Western Europe”. According to the case scenario, the risk management team is in the early stages of developing a formal risk management process for RoboSurge and has to consider the

occurrence of various risks that, if they occur, may have a significant negative impact on the success of the subsidiary. Participants are asked to assume the role of a risk management team leader charged with assessing a list of critical risk factors with respect to each risk's likelihood of occurrence. Specifically, with respect to each described risk, participants are asked to offer a judgment about the likelihood that "...this risk will occur at some point over the next 10 years". The impact of the risk factors is held constant across manipulations by telling participants to "assume [that their] team has determined that each of those risks could potentially force...RoboSurge out of business".

The experimental task is considered realistic given that prior research (e.g., Arena et al. 2010; Mikes and Kaplan 2014) suggests that the risk management function may be centralized and that accordingly decision-makers not only render judgments about spatially proximate targets (e.g., corporate headquarters or a nearby branch office), but also about spatially remote targets (e.g., offshore manufacturing facilities or remote distribution centers). Furthermore, the use of risk registers or centralized risk databases seems to be common practice (O'Donnell 2005; Fraser and Henry 2007; Mikes 2009; Mikes and Kaplan 2014). Appendix D illustrates the experimental material.

#### Independent and Dependent Variables

*Spatial distance* [DISTANCE] is manipulated by describing within the setting of the case scenario that RoboSurge is located in Toronto, Canada (proximate condition) or in Melbourne, Australia (remote condition). The independent variable *risk category* [CATEGORY] is manipulated by providing participants either a list of five operational risk factors or a list of five non-operational risk factors. All risk factors are adopted from a recent study by North Carolina

State University's ERM Initiative and Protiviti, Inc. that investigated senior executives' perspective with respect to 22 top risks grouped into three major categories: macroeconomic risks, strategic risks, and operational risks (Protiviti 2014a). In selecting the risk factors, care was taken to ensure that both risk categories (operational and non-operational) contain risks of comparable impact. This was accomplished by using the report's color-coding scheme for impact which is based on the responses from over 370 board members and executives who participated in the survey.

With the exception of replacing various pronouns with the company name ("RoboSurge") the risk factors used for the experiment were taken verbatim from the aforementioned study. No distinction was made between macroeconomic risks and strategic risk for purposes of conducting the main analyses; that is, the five non-operational risk factors include two risks identified by the survey as macroeconomic risk factors and three risks identified as strategic risk factors.<sup>35</sup> Given the exploratory nature of this study and the fact that risk description abstractness is argued to affect probability assessment, a more refined breakdown of risk categories was not deemed critical. Furthermore, both the academic and the practitioner literature on risk management use multiple risk taxonomies that cannot unambiguously be reconciled with one another. For example, Kaplan and Mikes (2012) categorize *disruptive technologies* as an *external risk* (rather than a *preventable* or *strategy risk*) and thus as belonging into a risk category that also includes natural disasters and geopolitical risks. However, Protiviti (2014a) classifies *disruptive*

---

<sup>35</sup> Some authors (e.g., Kaplan and Mikes 2012) argue that assigning probabilities to external risks is not very practical. However, others take the position that the probability of almost any risk factor should be considered. For example, the COSO-commissioned risk assessment practice guide (Deloitte 2012) provides an illustrative heat map which displays likelihood assessment scores for risks such as 'exchange rate fluctuations', and 'economic downturn'.

*technological innovations* as a *strategic risk*. As alluded to by the opening quote to this study, no single definition of risk is consistently applied. Table 21 lists the selected risk factors.

Table 21: Risk Factors - Experiment 2

---

### **Risk Factors**

#### *Operational Risk Factors<sup>a</sup>*

- Risk Factor 1: Uncertainty surrounding the viability of key suppliers or scarcity of supply will make it difficult to deliver [company's] products and services.
- Risk Factor 2: Cyber threats have the potential to significantly disrupt [company's] core operations.
- Risk Factor 3: [Company's] existing operations may not be able to meet performance expectations related to quality, time to market, cost and innovation as well as its competitors.
- Risk Factor 4: Succession challenges and the ability to retain top talent may limit [company's] ability to achieve operational targets.
- Risk Factor 5: Inability to utilize data analytics and "big data" to achieve market intelligence and increase productivity and efficiency is likely to affect [company's] management of core operations and strategic plan.

#### *Non-Operational Risk Factors*

- Risk Factor 1<sup>b</sup>: Potential changes in trade restrictions or other government sanctions will limit [company's] ability to operate effectively and efficiently in international markets.
- Risk Factor 2<sup>b</sup>: Economic conditions in markets [company name] currently serves will significantly restrict growth opportunities for the organization.
- Risk Factor 3<sup>c</sup>: Ease of entrance of new competitors into the industry and marketplace will threaten [company's] market share.
- Risk Factor 4<sup>c</sup>: Shifts in social, environmental, and other customer preferences and expectations will be difficult for [company name] to identify and address on a timely basis.
- Risk Factor 5<sup>c</sup>: An unexpected crisis would likely have a significant impact on [company's] reputation given the organization's existing preparedness.
- 

<sup>a</sup> As classified by Protiviti (2014a)

<sup>b</sup> Classified as a macroeconomic risk factor by Protiviti (2014a)

<sup>c</sup> Classified as a strategic risk factor by Protiviti (2014a)

The dependent variable is *average probability assessment*, a summary measure representing the average of all five probability judgments provided by each participant. After

reading each of the five risk factors, participants responded to the question “How likely do you think it is that this risk will occur at some point over the next 10 years?” Responses were captured on a sliding scale with a minimum of 0% and a maximum of 100%. Percentages selected were displayed and recorded at each 1% increment.

In addition to responding to the dependent variable measure for each risk factor, participants also answered two loosely related questions designed to capture their subjective assessment of each risk’s potential impact on RoboSurge’s operations. Given COSO’s (2004, 2013) observation that *impact* is a critical factor in the determination of organizational risk management practices, it was considered important to measure impact perceptions in spite of the fact that the case material was designed to hold impact constant. The first impact-related question states “Assume this risk materializes at the Toronto [or: Melbourne, depending on condition] operations. How significant do you think its impact will be?” Responses were captured on a 5-point Likert scale anchored by 1 (“No impact at all”) and 5 (“Extensive impact”). The second question asks “How important do you think it is to devote resources to manage this risk?” Responses were captured on a 5-point Likert scale anchored by 1 (“Not at all important”) and 5 (“Extremely important”).

### Manipulation Checks

After completing the task, participants responded to two manipulation check questions. Given the research question, it is critical that participants pay sufficient attention to the spatial distance component of the experimental material. Accordingly, the following true/false items were included as manipulation checks: (1) “The scenario you just read described that your entire risk management team is based out of ABC’s headquarter in Chicago, IL”; (2) The preceding



scenario described that RoboSurge is located in Toronto, Canada [or: Melbourne, Australia – depending on spatial condition].” Participants who failed to respond “True” to one or both questions were exited from the survey.<sup>36</sup> Thus, the final sample consists only of participants who passed both manipulation check questions.

### Debriefing Questions

Debriefing questions inquire about participants’ experience with probability assessment and the use of risk registers. The following questions, both in yes/no format, were posed: (1) “Have you ever served as a member of a team which had to assess the probability (i.e., the likelihood) that certain risks will materialize?”; (2) “Have you ever used a checklist or risk register which lists various risk factors and asks you to make a judgment about the likelihood that those risks will materialize (e.g., the checklist or risk register may ask you to rate each risk as “unlikely”, “likely”, “frequent”, “rare”, etc.; alternatively, the checklist or risk register may ask you for a percentage similar to the preceding task)?” Almost all participants (148 individuals; 91.9%) indicated that they had prior experience with assessing risk probabilities. Moreover, 141 participants (87.6%) indicated that they had previously used a checklist or risk register. There was no statistically significant difference across experimental conditions with respect to both questions (p-value = .877 and .139, respectively).

---

<sup>36</sup> A total of 758 participants started the survey. Of those, 597 were eliminated, primarily because of a failure to pass the screening questions. The final sample of 161 consists of all participants who were paid for by the researcher and hence by the survey company.

## Results

H1c predicts that decision-makers who evaluate a spatially remote target will assign a lower probability to the occurrence of various risk factors than decision-makers who evaluate a spatially proximate target. As such, H1c predicts a main effect for independent variable DISTANCE. The second hypothesized main effect, articulated in H2, concerns independent variable CATEGORY. H2 predicts that decision-makers will perceive operational risk factors as more likely to materialize than non-operational risk factors. Lastly an interaction between DISTANCE and CATEGORY is hypothesized in H3 which predicts that decision-makers will assess the probability that a risk will materialize to be lowest when assessing a remote risk target and the risk factor is non-operational. As such, a graphical depiction of the results is expected to reflect the trend line pattern illustrated in Figure 12 in which the trend line for the proximate target lies above the trend line for the remote target and approaches the latter in the non-operational risk condition.

Participants' mean probability assessments are graphically depicted in Figure 13. The trend line for the proximate target (hyphenated line) lies above the trend line for the remote target (solid line) and both lines exhibit the predicted downward slope. Furthermore, the hyphenated trend line appears to approach the solid line in the non-operational risk condition. While the anticipated slope change is less pronounced than in Figure 12, the ordinal interaction predicted in H3 appears to be supported.

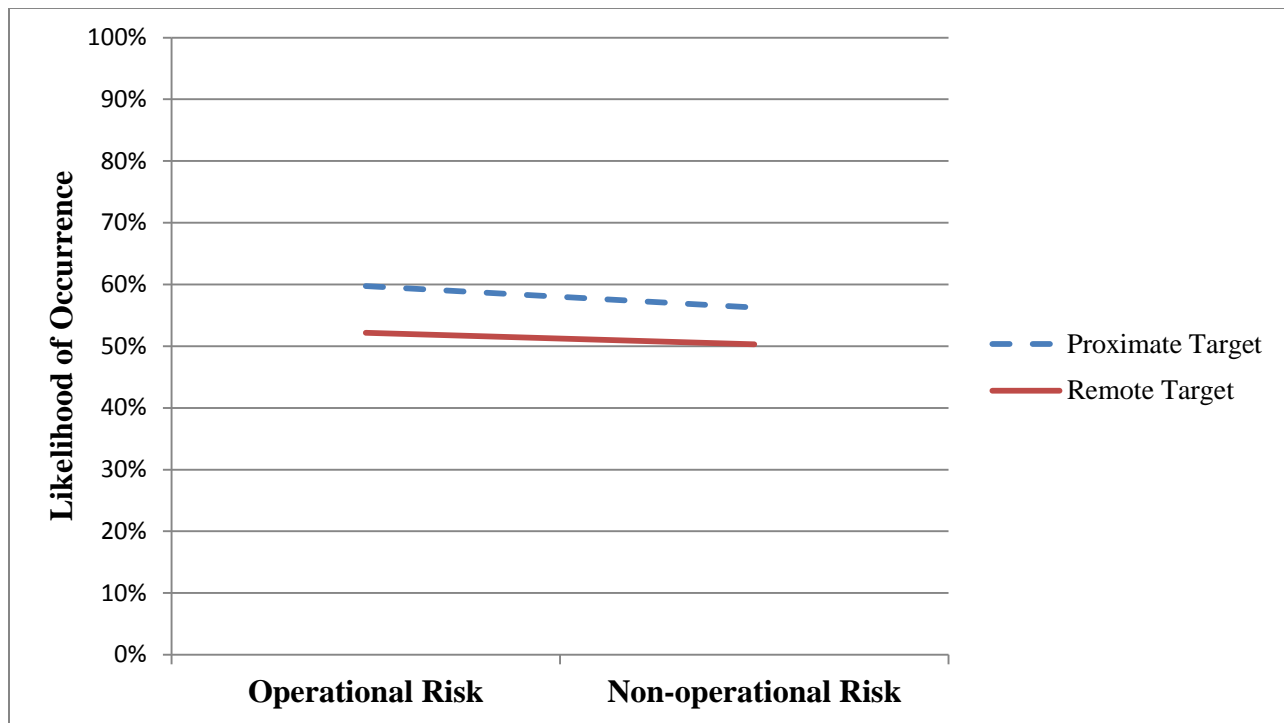


Figure 13: Estimated Marginal Means - Experiment 2

Prior to conducting hypotheses testing for H1c and H2 via ANCOVA, a linear regression (untabulated) was performed in order to identify potential covariates. All demographic variables (age, years of risk management experience, years of overall work experience, gender, position, education, and professional licenses) along with the two risk-impact related measures discussed in section “Debriefing Questions” were simultaneously regressed on the dependent variable. None of the demographic variables was significant. However, measured variable *impact* was significant. The results reported below therefore include covariate *impact*.

Table 22 - Panel A displays the descriptive statistics for the participants’ average probability assessment concerning the occurrence of various organizational risk factors under each of the four treatment conditions. Panel A reveals that all means point in the predicted directions. ANCOVA results reported in Table 22 - Panel B show a significant main effect for DISTANCE ( $F = 3.078$ , one-tailed  $p$ -value = .041), in line with expectations. H1c is supported.

Participants who evaluated the remote risk target assigned a lower probability to the occurrence of various risk factors than those who evaluated the spatially proximate risk target. Contrary to expectations, ANCOVA results do not support the predicted main effect for CATEGORY ( $F = .159$ , one-tailed  $p$ -value = .345). H2 is therefore not supported. Participants did not perceive operational risk factors to be more likely to occur than non-operational risk factors.

To test the prediction that probability assessments are lowest when participants assess non-operational risk factors at a remote risk target (H3), a planned contrast (1, 1, 1, -3) was conducted. The test examines whether the average probability assessment provided by participants in the remote target / non-operational risk condition was lower than the corresponding average probability assessment provided by participants in the other three conditions. Results from a planned contrast reported in Table 22 – Panel C support H3 (contrast value = 17.217, d.f. =3, one-tailed  $p$ -value = .049). Participants in the remote target / non-operational risk condition did provide significantly lower average probability assessments.

Table 22: Results - Experiment 2

<b>Panel A: Descriptive Statistics – Mean (Standard Deviation) [Sample Size]</b>			
	<b>Risk Type</b>		<b>Overall</b>
<b>Distance</b>	<b>Operational</b>	<b>Non-operational</b>	<b>Distance</b>
Proximate	59.73 (16.63) [41]	56.26 (20.61) [42]	57.97 (18.72) [83]
Remote	52.16 (20.49) [38]	50.31 (17.52) [40]	51.21 (18.92) [78]
Overall Risk Type	56.09 (18.85) [79]	53.36 (19.28) [82]	54.70 (19.06) [161]

<b>Panel B: Results of ANCOVA with Probability Assessment as Dependent Measure</b>					
<b>Source</b>	<b>S.S</b>	<b>d.f.</b>	<b>M.S.</b>	<b>F-Ratio</b>	<b>p-value<sup>a</sup></b>
Distance <sup>b</sup>	701.848	1	701.848	3.078	.041
Category <sup>c</sup>	36.367	1	36.367	.159	.345
Distance * Category	66.672	1	66.672	.292	.295
Impact (covariate)	20413.867	1	20413.867	89.520	<.001
Error	35573.921	156	228.038		
Total	539814.520	161			
<b>Panel C: Planned Contrast (H3)</b>					
Contrast Coding: 1, 1, 1, -3					
	<b>Contrast Value</b>	<b>d.f.</b>			<b>p-value<sup>a</sup></b>
Remote / non-operational risk factor condition vs. all other conditions	17.217	3			.049

<sup>a</sup> One-tailed significance level

<sup>b</sup> Spatial Distance was manipulated between participants at two levels: proximate and remote. In the ‘proximate’ condition, participants were informed that the risk assessment target was a subsidiary located in Toronto, Canada. In the ‘remote’ condition, participants were informed that the risk assessment target was a subsidiary located in Melbourne, Australia.

<sup>c</sup> Risk Type was manipulated between participants at two levels: operational and non-operational. An average score was computed for the five operational and the five non-operational risk factors, respectively.

### Additional Analyses

The analysis reported above is based on a broad classification of risk factors into two major risk categories: operational risk factors and non-operational risk factors. As discussed earlier, dichotomous classification was considered appropriate given the exploratory nature of this research and the subjectivity inherent in classifying various risks. In additional analyses, a slightly more refined approach to classifying risk factors is taken. Specifically, the five non-operational risk factors are separated into *macroeconomic* risk factors and *strategic* risk factors based on the respective risk factors’ original classification in the Protiviti (2014a) survey. That is, non-operational risk factors number one (trade restrictions) and number two (macro-economic

conditions) listed in Table 21 are classified as macroeconomic risk factors and the remaining three non-operational risk factors are classified as strategic risk factors. Using this breakdown, separate ANCOVAs are performed. Table 23 reflects this breakdown and displays descriptive statistics for the participants' probability assessment concerning the occurrence of each individual risk factor under both the proximate and remote conditions.

Table 23: Individual Risk Factors - Experiment 2

---

**Probability Assessments by Risk Factor (RF) - Mean (Standard Deviation)**

<b><u>Operational Risk Factors<sup>a</sup></u></b>	<b><u>Proximate</u></b>	<b><u>Remote</u></b>	<b><u>Total</u></b>
	<i>N=41</i>	<i>N=38</i>	<i>N=79</i>
RF 1: key supplier viability	59.22 (22.37)	55.58 (25.90)	57.47 (24.04)
RF 2: cyber threats	67.05 (23.85)	63.16 (24.99)	65.18 (24.32)
RF 3: meeting performance expectations	56.56 (23.23)	48.39 (24.54)	52.63 (24.07)
RF 4: succession challenges	57.41 (24.88)	44.63 (23.68)	51.27 (24.00)
RF 5: data analytics problems	58.39 (23.91)	49.03 (26.07)	53.89 (25.25)
<b>Total – Operational Risk Factors</b>	<b>59.73 (16.63)</b>	<b>52.16 (20.49)</b>	<b>56.09 (18.85)</b>
<b><u>Non-Operational Risk Factors</u></b>	<b><u>Proximate</u></b>	<b><u>Remote</u></b>	<b><u>Total</u></b>
<i>Macroeconomic Risk Factors<sup>a</sup></i>	<i>N=42</i>	<i>N=40</i>	<i>N=82</i>
RF 1: trade restrictions	54.93 (25.32)	53.65 (23.22)	54.30 (24.18)
RF 2: macro-economic conditions	57.17 (23.12)	48.93 (19.69)	53.15 (21.78)
<b>Total – Macroeconomic Risk Factors</b>	<b>56.05 (21.83)</b>	<b>51.29 (19.57)</b>	<b>53.73 (20.77)</b>
<i>Strategic Risk Factors<sup>a</sup></i>			
RF 3: new competitors	58.38 (23.79)	51.18 (19.99)	54.87 (22.18)
RF 4: shifts in social expectations	53.43 (27.35)	48.80 (24.24)	51.17 (25.82)
RF 5: unexpected crisis	57.40 (26.69)	49.00 (26.03)	53.30 (26.55)
<b>Total – Strategic Risk Factors</b>	<b>56.41 (21.95)</b>	<b>49.66 (19.87)</b>	<b>53.12 (21.11)</b>
<b>Total – Non-Operational Risk Factors</b>	<b>56.26 (20.61)</b>	<b>50.31 (17.52)</b>	<b>53.36 (19.28)</b>

---

<sup>a</sup> As classified by Protiviti (2014a)

Table 24 - Panel A displays the descriptive statistics for the participants' average probability assessment concerning the occurrence of five operational risk factors and the average probability assessment concerning the occurrence of two macroeconomic risk factors under both the proximate and remote conditions. Similar to the main analysis, Panel A reveals that all means point in the predicted directions. ANCOVA results reported in Table 24 - Panel B mirror those for the main analyses. Results show a significant main effect for DISTANCE ( $F = 3.818$ , one-tailed  $p$ -value = .026), in support of H1c. Also similar to the main analyses, the predicted main effect for CATEGORY is not significant ( $F = .378$ , one-tailed  $p$ -value = .270). Hence, H2 is not supported when the non-operational risk factor category is limited to macroeconomic risk factors. However, results from a planned contrast (1, 1, 1, -3) moderately support H3 (contrast value = 14.070, d.f. =3, one-tailed  $p$ -value = .097).

Table 24: Additional Analyses - Experiment 2: Macroeconomic Risk Factors

<b>Panel A: Descriptive Statistics – Mean (Standard Deviation) [Sample Size]</b>			
	<b>Risk Type</b>		<b>Overall</b>
<b><u>Distance</u></b>	<b><u>Operational</u></b>	<b><u>Macroeconomic</u></b>	<b>Distance</b>
Proximate	59.73 (16.63) [41]	56.05 (21.83) [42]	57.87 (19.41) [83]
Remote	52.16 (20.49) [38]	51.29 (19.57) [40]	51.71 (19.90) [78]
Overall Risk Type	56.09 (18.85) [79]	53.73 (20.77) [82]	54.88 (19.83) [161]

<b>Panel B: Results of ANCOVA with Probability Assessment as Dependent Measure</b>					
<b>Source</b>	<b>S.S</b>	<b>d.f.</b>	<b>M.S.</b>	<b>F-Ratio</b>	<b>p-value<sup>a</sup></b>
Distance <sup>b</sup>	935.468	1	935.468	3.818	.026
Category <sup>c</sup>	92.514	1	92.514	.378	.270
Distance * Category	19.001	1	19.001	.078	.391
Impact (covariate)	22848.774	1	22848.774	93.255	<.001
Error	38222.228	156	245.014		
Total	547859.410	161			

<b>Panel C: Planned Contrast (H3)</b>				
	<b>Contrast Value</b>	<b>d.f.</b>		<b>p-value<sup>a</sup></b>
Contrast Coding: 1, 1, 1, -3				
Remote / macroeconomic risk factor condition vs. all other conditions	14.070	3		.097

<sup>a</sup> One-tailed significance level

<sup>b</sup> Spatial Distance was manipulated between participants at two levels: proximate and remote. In the ‘proximate’ condition, participants were informed that the risk assessment target was a subsidiary located in Toronto, Canada. In the ‘remote’ condition, participants were informed that the risk assessment target was a subsidiary located in Melbourne, Australia.

<sup>c</sup> Risk Type was manipulated between participants at two levels: operational and non-operational. An average score was computed for the five operational and the two macroeconomic risk factors, respectively.

Table 25 - Panel A displays the descriptive statistics for the participants’ average probability assessment concerning the occurrence of five operational risk factors and the average probability assessment concerning the occurrence of three strategic risk factors under both the proximate and remote conditions. Similar to the main analysis, Panel A reveals that all means point in the predicted directions. ANCOVA results reported in Table 25 - Panel B mirror those for the main analyses. Results show a moderately significant main effect for DISTANCE (F = 2.313, one-tailed p-value = .065). Again, H1c is supported. Table 25 - Panel B further shows a significant main effect for CATEGORY (F = 46.316, one-tailed p-value < .001). Participants perceive operational risk factors to be more likely to occur than strategic risk factors. H2 is



supported. Lastly, support is found for H3 using a planned contrast (1, 1, 1, -3) (contrast value = 19.317, d.f. =3, one-tailed p-value = .039). In sum, hypotheses H1c through H3 are supported when the non-operational risk factor category is restricted to contain only strategic risk factors.

Table 25: Additional Analyses - Experiment 2: Strategic Risk Factors

<b>Panel A: Descriptive Statistics – Mean (Standard Deviation) [Sample Size]</b>			
	<b>Risk Type</b>		<b>Overall</b>
<b>Spatial Distance</b>	<b>Operational</b>	<b>Strategic</b>	<b>Distance</b>
Proximate	59.73 (16.63) [41]	56.41 (21.95) [42]	58.05 (19.46) [83]
Remote	52.16 (20.49) [38]	49.66 (19.87) [40]	50.88 (20.08) [78]
Overall Risk Type	56.09 (18.85) [79]	53.12 (21.11) [82]	54.57 (20.03) [161]

<b>Panel B: Results of ANCOVA with Probability Assessment as Dependent Measure</b>					
<b>Source</b>	<b>S.S</b>	<b>d.f.</b>	<b>M.S.</b>	<b>F-Ratio</b>	<b>p-value<sup>a</sup></b>
Distance <sup>b</sup>	594.874	1	594.874	2.313	.065
Category <sup>c</sup>	11913.137	1	11913.137	46.316	<.001
Distance * Category	189.849	1	189.849	.738	.196
Impact (covariate)	21629.443	1	21629.443	84.091	<.001
Error	40125.710	156	257.216		
Total	543692.510	161			

<b>Panel C: Planned Contrast (H3)</b>			
	<b>Contrast Value</b>	<b>d.f.</b>	<b>p-value<sup>a</sup></b>
Contrast Coding: 1, 1, 1, -3			
Remote / strategic risk factor condition vs. all other conditions	19.317	3	.039

<sup>a</sup> One-tailed significance level

<sup>b</sup> Spatial Distance was manipulated between participants at two levels: proximate and remote. In the ‘proximate’ condition, participants were informed that the risk assessment target was a subsidiary located in Toronto, Canada. In the ‘remote’ condition, participants were informed that the risk assessment target was a subsidiary located in Melbourne, Australia.

<sup>c</sup> Risk Type was manipulated between participants at two levels: operational and non-operational. An average score was computed for the five operational and the three strategic risk factors, respectively.

## Conclusion

Responding to Jordan et al.'s (2013) call for research on risk registers and Ballou et al.'s (2011) call for an investigation of whether *risk category* affects risks assessment, the present study draws on construal level theory of psychological distance to examine how spatial distance from a risk assessment target and risk category affects decision-makers' assessment of the probability that a given risk will occur. Two experiments, one involving 80 first-year M.B.A. students (Experiment 1) and one involving 161 risk managers (Experiment 2) are conducted.

Experiment 1 is considered exploratory and examines whether individuals intuitively associate the occurrence of low-probability risks with distant locations and the occurrence of high-probability risks with proximate locations. Contrary to expectations and potentially due a mismatch between participants' actual experience and the amount of expertise necessary for rendering truly intuitive judgments in the domain of risk management, the results from Experiment 1 do not support the hypothesized association.

Experiment 2 constitutes the main analysis and investigates directly how spatial distance from a risk assessment target and the type of risk subject to analysis affect risk-related probability judgments. Results provide evidence of significant spatial distance effects on decision-makers' judgment. Risk managers who evaluated a spatially remote risk target judged the probability that various risk factors will materialize to be lower than their counterparts who evaluated a spatially proximate risk target. Moreover, while risk managers did not perceive operational risk factors as more likely to occur than non-operational risk factors, they judged the probability that a risk will materialize to be lowest when assessing a remote risk target and the risk factor is non-operational. This finding has potentially important implications for risk management practice as it could explain why insufficient resources are devoted to managing

various strategic or macroeconomic risks (assuming those decisions are centralized). Given the lack of support for the predicted main effect of risk category in Experiment 2, additional testing was performed in order to gain a better understanding of the role of risk category on professional decision-makers' judgment.

In additional analyses, non-operational risk factors are further separated into macroeconomic risk factors and strategic risk factors prior to hypotheses testing. That is, the first analysis dichotomizes risk category into *operational* and *macroeconomic* risk factors while the second analysis dichotomizes risk category into *operational* and *strategic* risk factors. Results from the first analysis mirror those from the primary analysis. Probability assessments were lower when a spatially remote risk target was considered and lowest when a remote risk target was considered and the risk factor was macroeconomic. However, results from the second analysis show a significant main effect for risk category in addition to the predicted main effect for spatial distance and the predicted interaction effect. Risk managers perceived operational risk factors as more likely to occur than strategic risk factors. Together, the results reported in this study provide initial evidence that professional decision-makers' risk probability judgments are systematically affected by spatial distance from the risk assessment target and that the interaction between spatial distance effects and the effects stemming from risk category prompts decision-makers to provide lowest probability estimates when assessing the likelihood that non-operational risk factors will materialize at spatially remote locations.

The present research thus offers preliminary insights into the 'black box' representing the probability assessment module within the risk assessment procedure outlined by COSO 2004 and offers additional information about actual ERM processes as desired by board members. By identifying psychological distance as a potential cause for judgment bias during the corporate

risk assessment process the present research adds to the list of potential judgment traps identified in a recent COSO-commissioned thought paper and thus contributes to the corporate governance literature. The study also informs risk management practice by providing tentative evidence that the *abstractness* associated with the description of various risks may constitute a factor that influences probability assessment. Lastly, this study informs the psychology literature by suggesting that the predictions derived from CLT hold in professional settings as long as the decision at hand is largely within the experience domain of the decision-maker and thus permits the influence of intuition.

Similar to most laboratory studies, the absence of accountability and the potential lack of pertinent information present in a real risk management environment constitute limitations. Another shortcoming to this study is that only a limited selection of risks was presented to the participants. Moreover, the ten risk factors incorporated in the experimental material were subjectively chosen. Results may have differed had a larger variety of risks been selected or if different risks had been chosen by the researcher. However, all risk factors incorporated in this study were adapted from a recent large-scale survey of board members and executives and an effort was made to include only risks that, according to the survey, were considered equally important in terms of their organizational impact.

Future studies could investigate how other dimensions of psychological distance – e.g., temporal distance – affect decision-makers' judgment in the context of probability assessment within an ERM environment. Such studies could, for example, focus on the assessment of the probability that a 'black swan' event occurs in the distant versus near future (see Wakslak 2012). Another promising area for future research is to apply a more fine-tuned examination of the impact of risk category on risk assessment. Future studies could, for example, attempt to extend

Experiment 2 by incorporating a wider variety of risk factors or by directly manipulating the abstractness of various risk factors. Such analysis may provide more direct evidence of the effects of *risk abstractness* on probability judgment. Moreover, while the current study categorizes risk dichotomously, future studies could use more refined risk taxonomies. Examples include the risk categories proposed by Kaplan and Mikes (2012): preventable risks, strategy risks, and external risk; a taxonomy of global risks proposed by the World Economic Forum (2014): economic risks, environmental risks, geopolitical risks, societal risks, and technological risks; and, in the domain of interorganizational relationships, the three risk categories associated with the critical risk factors identified by Sutton et al. (2008): technical risks, application-user risks, and business risks.

## References

- American Institute of Certified Public Accountant (AICPA). 2006. *Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement*. Statement on Auditing Standards No. 109. Available at: <http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-00314.pdf>.
- Arena, M., M. Arnaboldi, and G. Azzone. 2010. The organizational dynamics of enterprise risk management. *Accounting, Organizations and Society* 35 (7): 659-675.
- Arnold, V., C. Hampton, D. Khazanchi, and S. G. Sutton. 2011. Managing risk in interorganizational relationships: factors influencing the desirability of e-commerce assurance. Working Paper.
- Arnold, V., T. Benford, C. Hampton, and S. G. Sutton. 2010. Competing pressures of risk and absorptive capacity potential on commitment and information sharing in global supply chains. *European Journal of Information Systems* 19 (2): 134-152.
- Arnold, V., T. Benford, J. Canada, and S. G. Sutton. 2011. The role of strategic enterprise risk management and organizational flexibility in easing new regulatory compliance. *International Journal of Accounting Information Systems* 12 (3): 171-188.
- Arnold, V., T. S. Benford, C. Hampton, and S. G. Sutton. 2012. Enterprise risk management as a strategic governance mechanism in B2B-enabled transnational supply chains. *Journal of Information Systems* 26 (1): 51-76.
- Arnold, V., T. Benford, C. Hampton, and S. G. Sutton. 2014. Enterprise risk management: Re-conceptualizing the role of risk and trust on information sharing in transnational alliances. *Journal of Information Systems* (forthcoming).
- Ballou, B., and D. L. Heitger. 2008. Integrating governance risk and reporting to create long-term value. *Strategic Finance* 89 (11): 36-41.
- Ballou, B., D. L. Heitger, and D. Stoel. 2011. How boards of directors perceive risk management information. *Management Accounting Quarterly* 12 (4): 14-22.
- Bar-Anan, Y., N. Liberman, and Y. Trope. 2006. The association between psychological distance and construal level: Evidence from an implicit association test. *Journal of Experimental Psychology: General* 135 (4): 609-622.
- Baxter, R., J. C. Bedard, R. Hoitash, and A. Yezegel. 2013. Enterprise risk management program quality: Determinants, value relevance, and the financial crisis. *Contemporary Accounting Research* 30 (4): 1264-1295.

- Beasley, M. S., and M. L. Frigo. 2007. Strategic risk management: Creating and protecting value. *Strategic Finance* 88 (11): 25-53.
- Beasley, M. S., B. C. Branson, and B. V. Hancock. 2010. Are you identifying your most significant risks? *Strategic Finance* 92 (5): 29-35.
- Beasley, M. S., R. Clune, and D. R. Hermanson. 2005. Enterprise risk management: An empirical analysis of factors associated with the extent of implementation. *Journal of Accounting and Public Policy* 24 (6): 521-531.
- Cantor, D. E., and J. R. Macdonald. 2009. Decision-making in the supply chain: Examining problem solving approaches and information availability. *Journal of Operations Management* 27 (3): 220-232.
- Chambers, A. 2012. *Notes and Recommendations (at end) on COSO's December 2011 Exposure Draft*. Available at:  
[http://www.coso.org/documents/IC\\_COSO\\_COMMENTS/PREVIOUS/88-1562905f-cf18-4d9c-9bab-61e3c88e57fc\\_New%20COSO\\_2011\\_12.pdf](http://www.coso.org/documents/IC_COSO_COMMENTS/PREVIOUS/88-1562905f-cf18-4d9c-9bab-61e3c88e57fc_New%20COSO_2011_12.pdf).
- Collier P. M. 2009. *Fundamentals of Risk Management for Accountants and Managers*. Elsevier. Amsterdam.
- Committee of Sponsoring Organizations of the Treadway Commission (COSO). 1992. *COSO report: Internal control – An integrated framework*. New York: AICPA.
- Committee of Sponsoring Organizations of the Treadway Commission (COSO). 2004. *Enterprise Risk Management – Integrated Framework*. New York, NY: AICPA.
- Committee of Sponsoring Organizations of the Treadway Commission (COSO). 2013. *Internal Control – Integrated Framework*. Executive Summary. Available at:  
[http://www.coso.org/documents/990025P\\_Executive\\_Summary\\_final\\_may20\\_e.pdf](http://www.coso.org/documents/990025P_Executive_Summary_final_may20_e.pdf).
- Deloitte & Touche LLP. 2012. *Risk Assessment in Practice*. Available at:  
[http://www.coso.org/documents/COSOAnnncsOnlineSurvy2GainInpt4Updt2IntrnlCntrlIntgratdFrmwrk%20-%20for%20merge\\_files/COSO-ERM%20Risk%20Assessment%20inPractice%20Thought%20Paper%20October%202012.pdf](http://www.coso.org/documents/COSOAnnncsOnlineSurvy2GainInpt4Updt2IntrnlCntrlIntgratdFrmwrk%20-%20for%20merge_files/COSO-ERM%20Risk%20Assessment%20inPractice%20Thought%20Paper%20October%202012.pdf).
- Foerstl, K., C. Reuter, E. Hartmann, and C. Blome. 2010. Managing supplier sustainability risks in a dynamically changing environment – Sustainable supplier management in the chemical industry. *Journal of Purchasing & Supply Management* 16 (2): 118-130.
- Fraser, I., and W. Henry. 2007. Embedding risk management: structures and approaches. *Managerial Auditing Journal* 22 (4): 392-409.

- Frigo, M. L., and R. J. Anderson. 2011. Strategic risk management: A foundation for improving enterprise risk management and governance. *The Journal of Corporate Accounting & Finance* 22 (3): 81-88.
- Frigo, M. L., and R. J. Anderson. 2014. Risk management frameworks: Adapt, don't adopt. *Strategic Finance* 96 (1): 49-53.
- Fujita, K., and H. A. Han. 2009. Moving beyond deliberative control of impulses. The effect of construal levels on evaluative associations in self-control conflicts. *Psychological Science* 20 (7): 799-804.
- Fujita, K., M. D. Henderson, J. Eng, Y. Trope, and N. Liberman. 2006. Spatial distance and mental construal of social events. *Psychological Science* 17 (4): 278-282.
- Gates, S., J. Nicolas, and P. L. Walker. 2012. Enterprise risk management: A process for enhanced management and improved performance. *Management Accounting Quarterly* 13 (3): 28-38.
- Gordon, L. A., M. P. Loeb, and C. Tseng. 2009. Enterprise risk management and firm performance: A contingency perspective. *Journal of Accounting and Public Policy* 28 (4): 301-327.
- Henderson, M. D. 2011. Mere physical distance and integrative agreements: When more space improves negotiation outcomes. *Journal of Experimental Social Psychology* 47 (1): 7-15.
- Henderson, M. D., and C. J. Wakslak. 2010. Over the hills and far away: The link between physical distance and abstraction. *Current Directions in Psychological Science* 19 (6): 390 - 394.
- Henderson, M. D., C. J. Wakslak, K. Fujita, and J. Rohrbach. 2011. Construal level theory and spatial distance: Implications for mental representation, judgment, and behavior. *Social Psychology* 42 (3): 165-173.
- Henderson, M. D., K. Fujita, Y. Trope, and N. Liberman. 2006. Transcending the "here": The effect of spatial distance on social judgment. *Journal of Personality and Social Psychology* 91 (5): 845-856.
- Hoyt, R. E., And A. P. Liebenberg. 2011. The value of enterprise risk management. *The Journal of Risk and Insurance* 78 (4): 795-822.
- Institute of Chartered Accountants in England and Wales (ICAEW). 1999. *Internal Control: Guidance for Directors on the Combined Code*. Available at: <http://www.ecgi.org/codes/documents/turnbul.pdf>.



- International Organization for Standardization (ISO). 2009. ISO 31000 – Risk management. Available at: <http://www.iso.org/iso/home/standards/iso31000.htm>.
- Janvrin, D. J., E. A. Payne, P. Byrnes, G. P. Schneider, and M. B. Curtis. 2012. The updated COSO internal control – integrated framework: Recommendations and opportunities for future research. *Journal of Information Systems* 26 (2): 189-213.
- Jia, L., E. R. Hirt, and S. C. Karpen. 2009. Lessons from a faraway land: The effect of spatial distance on creative cognition. *Journal of Experimental Social Psychology* 45 (5): 1127-1131.
- Jordan, S., L. Jorgensen, and H. Mitterhofer. 2013. Performing risk and the project: Risk maps as mediating instruments. *Management Accounting Research* 24 (2): 156-174.
- Kaplan, R. S., A. Mikes, R. Simons, P. Tufano, and M. Hofmann. 2009. Managing risk in the new world. *Harvard Business Review* 87 (10): 68-75.
- Kaplan, R. S., and A. Mikes. 2012. Managing risks: A new framework. *Harvard Business Review* 90 (6): 48-60.
- KPMG LLP. 2012. Enhancing Board Oversight: Avoiding Judgment Traps and Biases. Available at: [http://www.coso.org/documents/COSO-EnhancingBoardOversight\\_r8\\_Web-ready%20\(2\).pdf](http://www.coso.org/documents/COSO-EnhancingBoardOversight_r8_Web-ready%20(2).pdf).
- Liberman, N., and Y. Trope. 1998. The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology* 75 (1): 5-18.
- Liberman, N., and Y. Trope. 2008. The psychology of transcending the here and now. *Science* 322 (5905): 1201-1205.
- Liberman, N., M. D. Sagristano, and Y. Trope. 2002. The effect of temporal distance on level of mental construal. *Journal of Experimental Social Psychology* 38: 523-534.
- Liberman, N., Y. Trope, and E. Stephan. 2007a. Psychological distance. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2, pp. 353–383). New York, NY: Guilford Press.
- Liberman, N., Y. Trope, S. M. McCrea, and S. J. Sherman. 2007b. The effect of level of construal on the temporal distance of activity enactment. *Journal of Experimental Social Psychology* 43 (1): 143-149.
- Maglio, S. J., Y. Trope, and N. Liberman. 2013. Distance from a distance: Psychological distance reduces sensitivity to any further psychological distance. *Journal of Experimental Psychology: General* 142 (3): 644-657.

- McShane, M. K., A. Nair, and E. Rustambekov. 2011. Does enterprise risk management increase firm value? *Journal of Accounting, Auditing & Finance* 26 (4): 641-658.
- Mikes, A. 2009. Risk management and calculative cultures. *Management Accounting Research* 20 (1): 18-40.
- Mikes, A. 2011. From counting risk to making risk count: Boundary-work in risk management. *Accounting, Organizations and Society* 36 (4-5): 226-245.
- Mikes, A., and R. S. Kaplan. 2014. Towards a contingency theory of enterprise risk management. Working Paper. Available at SSRN: <http://ssrn.com/abstract=2311293>.
- Navon, D. 1977. Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology* 9 (3): 353-383.
- O'Donnell, E. 2005. Enterprise risk management: A systems-thinking framework for the event identification phase. *International Journal of Accounting Information Systems* 6 (3): 177-195.
- Power, M. 2007. *Organized Uncertainty*. New York, NY: Oxford University Press, Inc.
- Power, M. 2009. The risk management of nothing. *Accounting, Organizations and Society* 34 (6-7): 849-855.
- PricewaterhouseCoopers (PwC). 2009. *Extending Enterprise Risk Management (ERM) to address emerging risks*. Available at: <http://www.pwc.com/gx/en/research-publications/pdf/pwcglobalriskserm.pdf>.
- PricewaterhouseCoopers (PwC). 2013a. *State of the internal audit profession study: Reaching greater heights: Are you prepared for the journey?* Available at: [http://www.pwc.com/en\\_GR/gr/publications/assets/state-of-internal-audit-2013.pdf](http://www.pwc.com/en_GR/gr/publications/assets/state-of-internal-audit-2013.pdf).
- PricewaterhouseCoopers. 2013b. *Boards confront an evolving landscape. PwC's Annual Corporate Directors Survey 2013*. Available at: <http://www.pwc.com/us/en/corporate-governance/annual-corporate-directors-survey/assets/pdf/pwc-annual-corporate-directors-survey-full-report.pdf>.
- Protiviti. 2014a. Executive Perspectives on Top Risks for 2014. Available at: <http://www.protiviti.com/en-US/Documents/Surveys/NC-State-Protiviti-Survey-Top-Risks-2014.pdf>.
- Protiviti. 2014b. The Updated COSO Internal Control Framework. Available at: <http://www.protiviti.com/en-US/Documents/Resource-Guides/Updated-COSO-Internal-Control-Framework-FAQs-Second-Edition-Protiviti.pdf>.

- Public Company Accounting Oversight Board (PCAOB). 2007. *An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements*. Auditing Standard No. 5. Washington, DC. Available at: [http://pcaobus.org/standards/auditing/pages/auditing\\_standard\\_5.aspx](http://pcaobus.org/standards/auditing/pages/auditing_standard_5.aspx).
- Raiborn, C. A., J. B. Butler, and M. F. Massoud. 2009. Outsourcing support functions: Identifying and managing the good, the bad, and the ugly. *Business Horizons* 52 (4): 347-356.
- Renn, O. 1998. Three decades of risk research: accomplishments and new challenges. *Journal of Risk Research* 1 (1): 49-71.
- Sagrignano, M. D., Y. Trope, and N. Liberman. 2002. Time-dependent gambling: Odds now, money later. *Journal of Experimental Psychology: General* 131 (3): 364-376.
- Smith, P. K., and Y. Trope. 2006. You focus on the forest when you're in charge of the trees: Power priming and abstract information processing. *Journal of Personality and Social Psychology* 90 (4): 578-596.
- Soin, K., and P. Collier. 2013. Editorial: Risk and risk management in management accounting and control. *Management Accounting Research* 24 (2): 82-87.
- Standard & Poor's Financial Services LLC. 2006. Insurance Criteria: Refining the Focus of Insurer Enterprise Risk Management Criteria. Available at: [https://www.rims.org/resources/ERM\\_OLD/Documents/InsuranceCriteriaRefining.pdf](https://www.rims.org/resources/ERM_OLD/Documents/InsuranceCriteriaRefining.pdf).
- Sutton, S. G. 2006. Extended-enterprise systems' impact on enterprise risk management. *Journal of Enterprise Information Management* 19 (1): 97-114.
- Sutton, S.G., C. Hampton, D. Khazanchi, and V. Arnold. 2008. Risk analysis in extended enterprise environments: Identification of critical risk factors in B2B e-commerce relationships. *Journal of the Association for Information Systems* 9 (3&4): 151-174.
- Taleb, N. N. 2007. *The Black Swan – The Impact of the Highly Improbable*. Random House. New York.
- Todorov, A., A. Goren, and Y. Trope. 2007. Probability as a psychological distance: Construal and preferences. *Journal of Experimental Social Psychology* 43 (3): 473-482.
- Trope, Y., and N. Liberman. 2003. Temporal construal. *Psychological Review* 110 (3): 403-421.
- Trope, Y., and N. Liberman. 2010. Construal-level theory of psychological distance. *Psychological Review* 117 (2): 440-463.

- Trope, Y., N. Liberman, and C. Wakslak. 2007. Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior. *Journal of Consumer Psychology* 17 (2): 83-95.
- Trotman K. T., and A Wright. 2000. Order effects and recency: where do we go from here? *Accounting and Finance* 40 (2): 169-182.
- Wakslak, C. J. 2012. The where and when of likely and unlikely events. *Organizational Behavior and Human Decision Processes* 117 (1): 150-157.
- Wakslak, C. J., Y. Trope, N. Liberman, and R. Alony. 2006. Seeing the forest when entry is unlikely: Probability and the mental representation of events. *Journal of Experimental Psychology: General* 135 (4): 641-653.
- Wakslak, C., and Y. Trope. 2009. The effect of construal level on subjective probability estimates. *Psychological Science* 20 (1): 52-58.
- World Economic Forum. 2014. *Global risks 2014*. Available at: <http://www.weforum.org/reports/global-risks-2014-report>.
- Zhao, M., and J. Xie. 2011. Effects of social and temporal distance on consumers' responses to peer recommendations. *Journal of Marketing Research* 48 (3): 486-496.

## GENERAL CONCLUSION

The three studies presented in this dissertation explore the effects of psychological distance on judgment and decision-making in accounting. Construal level theory (CLT) of psychological distance (Liberman and Trope 1998; Trope and Liberman 2003), a framework recently developed in the field of social psychology, constitutes the theoretical foundation for each study. Study One describes the theory in detail, reviews research that applies the propositions derived from CLT to various decision domains, and offers broad, CLT-based research questions that are of interest to accounting researchers. Following this theoretical discussion, Study Two applies CLT to the audit context by investigating whether the degree of abstract thinking required for the performance of typical auditing tasks affects decision-makers' overall mindset and hence their subsequent judgment. Lastly, Study Three applies CLT to the enterprise risk management (ERM) context by examining how spatial distance from a risk assessment object and risk category (i.e., the type of risk) affects decision-makers' risk assessment. The following paragraphs discuss the unique contributions of each of these studies from a theory and/or practice perspective.

The literature review presented in Study One highlights the broad applicability of CLT by reporting theory-consistent results from studies that span judgment and decision-making domains ranging from everyday decision-tasks reported in the psychology literature to various professional judgments reported in a variety of business, economics, and decision-science fields. The reviewed literature suggests that individuals' predictions, evaluations, preferences, perceptions, and behaviors are affected by psychological distance, regardless of how psychological distance is initially invoked (e.g., through distancing on any distance dimensions

or through procedural priming). In particular, research shows that individuals' weigh various aspects of a situation or event differently, depending on psychological distance associated with the decision at hand. For example, greater psychological distance focuses decision-makers on *primary* rather than *secondary* features; on *desirability* rather than *feasibility* concerns; on *pros* rather than *cons*; on *idealistic* rather than *pragmatic* concerns; and on *non-alignable* rather than *alignable* features. Moreover, greater psychological distance promotes the consideration of values and overall attitudes, the ability to make proper trade-offs during negotiations, and the ability to exert self-control. Those findings, among others, have the potential to inform a wide variety of judgments relevant to accounting research and practice since accounting professionals, organizational actors, and other decision-makers who rely on accounting information regularly forecast situations, articulate preferences, assess situations, or act upon deliberations that involve varying degrees of psychological distance. A synthesis of extant CLT-informed accounting research supports this contention.

Given the relatively sparse amount of accounting studies that use CLT as a theoretical foundation, the articulation of a variety of broad research questions related to major accounting disciplines (accounting information systems, audit, financial accounting, managerial accounting, and tax) constitutes an important contribution of Study One. From a purely theoretical perspective, Study One also contributes to the accounting literature by underscoring the commonalities and differences between CLT and related or competing theories that have been used in behavioral accounting research. Future research can draw on those discussions in order to combine insights from CLT with those of other prominent theories. Most importantly, Study One encourages behavioral accounting researchers to gain a deeper understanding of the heuristics

and biases associated with judgment and decision-making by considering the mediating cognitive processes that are the focus of CLT.

Results from Study Two highlight the importance of considering the effects of task induced mindset orientation on intuitive judgments. Results indicate that auditors, who have adopted an abstract mindset orientation as a result of an unrelated preceding audit task, provide lower probability assessments than their counterparts who have adopted a concrete mindset orientation. However, results do not support the predicted irrelevance of whether the probability judgment is focused on the event (i.e., the collectability of accounts receivable) or the event's complement (i.e., the uncollectibility of accounts receivable). Possibly due to auditors' relative unfamiliarity with the manner in which the complement probability question was posed, the focus of the probability question may have affected auditors' judgment and counteracted the hypothesized decision-making bias which was expected to manifest as a significant interaction effect.

The results from a second experiment, designed to shed light on the underlying psychological processes activated in the auditor participants, fail to support the hypothesized effects. In Experiment 2, student participants who have adopted an abstract mindset orientation as a result of a construal mindset priming task, do not provide lower probability assessments than their counterparts who have adopted a concrete mindset orientation. Moreover, the hypothesized judgment bias, related to the combined probability assessments (i.e., probability of the event plus the probability of the complement) that are farther from 1 for participants who have adopted an abstract mindset orientation, lacks support.

Together, the results from Experiment 1, Experiment 2, and those from additional analyses that directly compare complement-focused probability judgments between participants

that have adopted an abstract mindset and those who have adopted a concrete mindset, reveal insights that should be of interest to accounting and psychology researchers alike: the CLT-based predictions concerning probability judgments may not hold in situations in which the judgment of concern is relatively unfamiliar to the decision-maker due to lack of prior exposure or focus of the judgment question. The study thus contributes to the psychology literature as it tests CLT-based probability assessment predictions in a professional setting and identifies a potential scope limitation of the theory. Future research could explore this proposition more thoroughly.

Overall, the results from Study Two have important implications for audit practice as they suggest that *task-induced mindset* can affect judgment related to a subsequent task even when the latter is completely unrelated to the initial task. This should be of interest to auditors who work in a multi-client, multi-task environment that requires frequent shifts in attention. Without such awareness, potentially mitigating de-biasing mechanism may be ignored or not be developed in the first place.

By highlighting how task abstractness can influence construal mindset and hence evaluative judgments, Study Two lays the foundation for future inquiry into the effects of construal mindset orientation on accounting professionals' predictions, preferences, and actions. Moreover, while Study Two uses a categorization task to induce an abstract mindset orientation, one should not conclude that this is the only way to prompt abstract thinking and hence the reported effects. The CLT literature suggests several other means for inducing an abstract mindset, all of which may be explored by future accounting research (e.g., comparing objects with nonalignable rather than alignable features; considering the *why* rather than the *how* aspects of a given situation; adopting another person's perspective; or envisioning that a decision is made for the distant future).



Results from Study Three offer critical insights into risk management practice that could explain why insufficient resources are devoted to managing various strategic risks. In particular, the study illustrates how both spatial distance from an object that is evaluated in terms of the risks it faces and risk category (i.e., the nature of the risk; risk type) systematically affect decision-makers' judgment concerning the likelihood that a given risk will occur. While the results from a preliminary experiment fail to support the prediction that decision-makers intuitively associate the occurrence of low-likelihood risks with remote locations and the occurrence of high-likelihood risks with nearby locations (possibly because the decision may have fallen outside the participants' area of expertise), the importance of spatial distance is corroborated in a second experiment.

Specifically, results from a second, more elaborate experiment, show that risk managers who assess a spatially distant corporate subsidiary judge the likelihood that various risk factors will occur to be lower than those who assess a spatially nearby subsidiary. While the predicted effect associated with risk category was not supported when risk category was broadly dichotomized (i.e., divided into operational and non-operational risk factors), a more refined analysis reveals that risk managers consider operational risk factors as more likely to occur than strategic risk factors (but not more likely than macroeconomic risk factors). Furthermore, results from Experiment 2 show that the evaluation of a spatially distant subsidiary with respect to non-operational risk factors leads to lowest probability estimates.

Together, the results from this study inform the corporate governance literature and alert risk management practice to potential judgment biases during the risk assessment process that may at least partially explain the systematic misallocation of risk management resources identified by PricewaterhouseCoopers (PwC 2009). Such insights are important to risk managers

and corporate staff involved in the development of risk registers, centralized risk databases, or other risk management tools (e.g., specialized software; decision-aids; risk visualization tools) that are used to render risk management resource allocation decisions. Awareness of the identified cognitive effects associated with risk category and spatial distance should encourage corporate risk managers to seek out potential de-biasing mechanisms. The search for such de-biasing mechanisms also offers an interesting avenue for future research. Future research could, for example, explore whether the *abstractness* associated with the description of various risks can be equalized among risk categories such that probability assessments will be less biased. Relatedly, future research could draw on more refined risk taxonomies in order to tease out the effects associated with risk category and hence risk description abstractness. Moreover, future inquiry may explore how other instantiations of psychological distance (e.g., temporal distance or social distance) affect risk managers' judgment.

In summary, the results reported in this dissertation suggest that psychological distance systematically affects individuals' judgment subject to the caveat that the judgment of concern falls within the domain of the decision-maker's routine cognition. By presenting empirical evidence from both the audit and the risk management domain, the studies contribute to our understanding of the heuristics and biases in judgment and decision-making in professional settings that are of interest to accounting research. The research questions offered in Study One as well as those outlined above suggest that CLT constitutes a suitable theoretical foundation for improving our understanding of the mediating cognitive processes that ultimately determine the decisions and actions of actors in a wide variety of distance-affected decision environments.

### References

- Liberman, N., and Y. Trope. 1998. The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology* 75 (1): 5-18.
- PricewaterhouseCoopers (PwC). 2009. *Extending Enterprise Risk Management (ERM) to address emerging risks*. Available at: <http://www.pwc.com/gx/en/research-publications/pdf/pwcglobalriskserm.pdf>.
- Trope, Y., and N. Liberman. 2003. Temporal construal. *Psychological Review* 110 (3): 403-421.

**APPENDIX A: STUDY 2 - EXPERIMENT 1:  
CASES AND QUESTIONNAIRE**

Condition 1: Abstract / Event

Do you have at least 2 years' of audit experience?

- Yes
- No

Are you currently working in public accounting?

- Yes
- No



**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task provides you with some background information about a hypothetical audit client and asks you to render decisions about various statements and their relation to fraud risk. The second task provides you with some background information about another hypothetical audit client and asks you to render several probability estimates. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary. Your responses will be confidential, your name will not be associated in any way with your responses, and only aggregated data will be included in any publications or presentations resulting from this study. Your name and email address will be collected in order for the payment (a \$15 gift card for either Starbucks or Amazon – depending on your choice) to be processed; however, they will be kept strictly confidential and will NOT be stored with data from your survey. Instead, you will be assigned a participant number and only your participant number will appear with your survey responses. Only the researchers will see your individual survey responses. Your name and email address will be used only for the purpose of processing the payment.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



### **General Instructions**

A couple of questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

**Thank you for participating!**



## Task 1 - Fraud Risk Factor Task

### BACKGROUND

You are the auditor in charge of an important client for your firm, Wittim Medical Supplies, Inc. Wittim manufactures a variety of medical supplies, including test tubes, thermometers, and disposable surgical garments. The list on the following screens contains statements about Wittim that are designed to help your firm assess the risk of misstatements arising from fraudulent financial reporting. The list was prepared by a staff member of your audit team. Your task is to group the statements into broad categories of risk factors so that each category of risk factors can subsequently be evaluated. In line with PCAOB Standards (AU Section 316), your firm categorizes risk factors into three broad categories.

The three categories are defined as follows:

1. **Incentives/Pressures:** Risk factors associated with pressures or motives that might entice management to perpetrate a dishonest or fraudulent act.
2. **Opportunities:** Risk factors associated with circumstances which would permit management to perpetrate a dishonest or fraudulent act.
3. **Attitudes/Rationalizations:** Risk factors indicative of an internal characteristic, personality trait, or set of ethical values, that might lead management to knowingly and intentionally commit a dishonest act, or rationalize such behavior.

Please consider carefully the implications of each of the following 30 statements and assign each statement to one of the above listed categories. Note that all statements relate to one of the three categories even though some statements suggest low risk (rather than heightened or normal risk) within its respective category. If you believe that a statement is ambiguous, please select the closest matching category.





	Incentives / Pressures	Opportunities	Attitudes / Rationalizations
1. There is no evidence that Wittim's audit committee oversight over the financial reporting process and internal control is ineffective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Wittim faces a high degree of competition, accompanied by declining margins.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Wittim's management does not display domineering behavior in dealing with our firm and does not seem to attempt to influence the scope of our audit work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Wittim's assets and revenues are based on significant estimates that involve subjective judgments or uncertainties that are difficult to corroborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Wittim's internal control components seem slightly deficient due to inadequate monitoring of automated controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim's management has occasionally failed to correct known reportable conditions on a timely basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim's management may have created high expectations for analysts and institutional investors through overly optimistic press releases.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Significant declines in customer demand and increasing business failures in Wittim's industry are not evident.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim's management does not impose unreasonable demands on our firm (e.g., no unreasonable time constraints regarding the completion of the audit).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Wittim holds several bank accounts in tax-haven jurisdictions for which there appears to be no clear business justification.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. There is some evidence that Wittim's nonfinancial management is excessively preoccupied with the selection of accounting principles and the determination of significant estimates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Wittim maintains an overly complex organizational structure involving unusual managerial lines of authority.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. There is no evidence that Wittim's management is dominated by a single person without compensating controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Overall, Wittim seems to have effective accounting and information systems in place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Wittim's management has a moderate financial interest in the company.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Incentives / Pressures	Opportunities	Attitudes / Rationalizations
16. Wittim's management seems overly committed to analysts with respect to achieving unrealistic forecasts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Wittim's management seems somewhat interested in employing inappropriate means to minimize reported earnings for tax-motivated reasons.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Wittim's management seems only moderately effective in communicating and enforcing the company's values and ethical standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Wittim's operating personnel feels moderately pressured to meet financial targets set up by the board of directors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Wittim's products are moderately vulnerable to rapid changes in technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Wittim needs to obtain additional debt or equity financing to stay competitive and to finance major research and development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Wittim's management shows excessive interest in increasing the company's earnings trend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Wittim engages in significant related-party transactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Wittim has a high turnover of board members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Wittim displays a marginal ability to meet exchange listing requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. Wittim is not subject to new regulatory requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. There is some evidence of recurring attempts by Wittim's management to justify marginal or inappropriate accounting on the basis of materiality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. Wittim has high turnover rates among information technology staff.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. Wittim has no known history of violations of securities laws or other laws and regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. The threat of a hostile takeover is not imminent since Wittim does not report operating losses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Task 2 - Accounts Receivable Task**

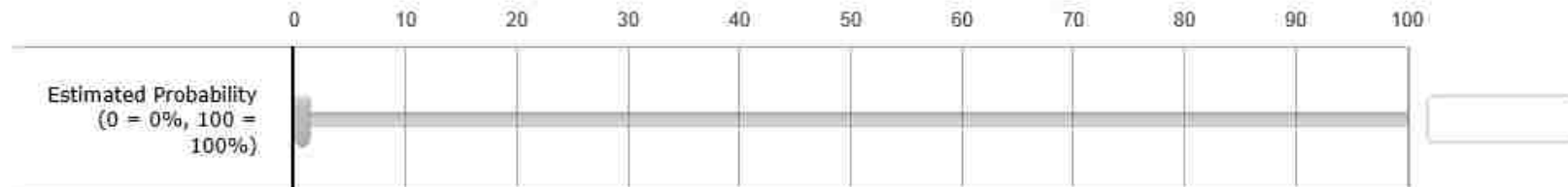
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

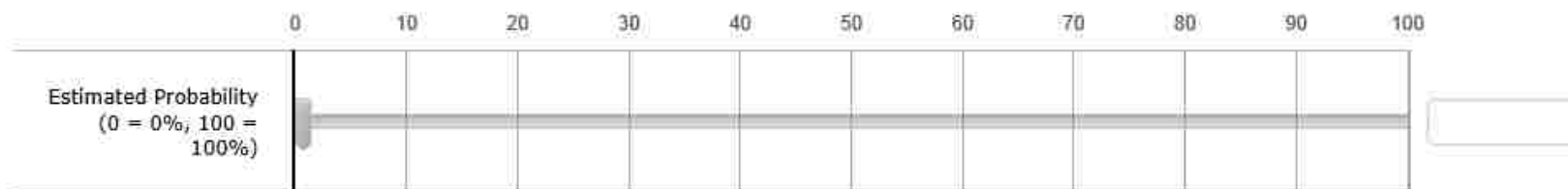
1. Based on the above information, what is your estimate of the probability that the receivable will be collectible next year?



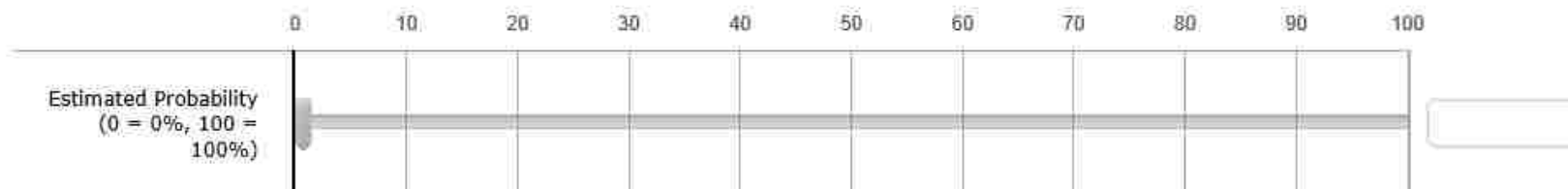
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

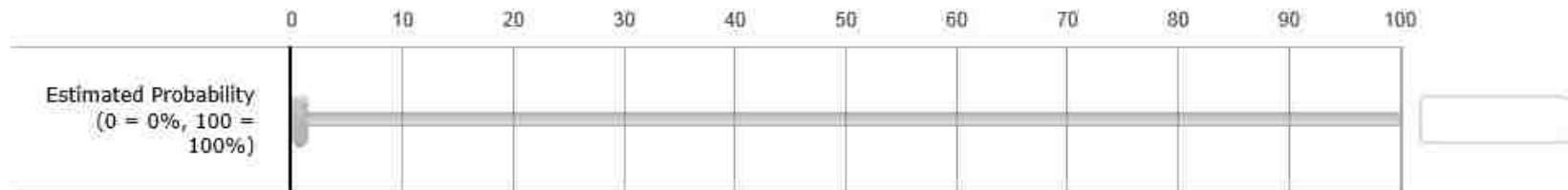
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



The two preceding tasks ("Fraud Risk Factor Task" and "Accounts Receivable Task") were related to the same audit client.

- True
- False



**What is your favorite color?**

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't read questions carefully. If you read this question and have read all the other questions, please select the box marked "other" and type "effort" (do not type the quotation marks) in the box below.

Thank you for participating and taking the time to read carefully!

- Red
- Green
- Blue
- Other (fill-in-the-blank box provided)



While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>





With the above definitions of **“Abstract Thinking”** and **“Concrete Thinking”** in mind, think back to the **Fraud Risk Factor Task** you completed (client “Wittim”) prior to the Accounts Receivable Task (client “Premier Electro Tech”). What type of thinking did the **Fraud Risk Factor Task** require?

- Abstract Thinking
- Concrete Thinking

How easy or difficult was the **Fraud Risk Factor Task** (Task 1 - related to client “Wittim”)?

Very easy

Easy

Neither easy nor difficult

Difficult

Very Difficult

Have you ever served as a member of an audit team in which you had to make an **assessment of likelihood** similar to the **Accounts Receivable Task** (Task 2 – related to client “Premier Electro Tech”) was made?

- Yes
- No





What is your age?

What is your gender?

- Male
- Female

How many years of audit experience do you have?

Which title best describes your position within your firm?

- Staff auditor
- Senior auditor
- Audit manager
- Audit director
- Audit partner

Which of the following best describes your firm?

- Big 4
- International
- National
- Regional
- Local

If you have recently left public accounting, how many months ago did you leave your firm? (please leave blank if not applicable)

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CA
- CIA
- CMA
- CPA
- None



**Thank you for your participation! You will now be redirected to another screen where you can enter your information to receive your \$15 gift card. PAYMENT WILL BE PROCESSED WITHIN 10 DAYS.**



**We thank you for your time spent taking this survey.**

**PLEASE SELECT THE CHOICE OF YOUR \$15 PAYMENT**

- Starbucks gift card
- Amazon gift card

**What is your name (First, Last)?**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**

**What is your email address? (Please use a personal email address to avoid corporate spam filters blocking payment)**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey. Your responses have been recorded.  
You will receive payment within the next 10 days. The gift card will be emailed to the email address you provided.

Condition 2: Abstract / Complement

Do you have at least 2 years' of audit experience?

- Yes
- No

Are you currently working in public accounting?

- Yes
- No



**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task provides you with some background information about a hypothetical audit client and asks you to render decisions about various statements and their relation to fraud risk. The second task provides you with some background information about another hypothetical audit client and asks you to render several probability estimates. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary. Your responses will be confidential, your name will not be associated in any way with your responses, and only aggregated data will be included in any publications or presentations resulting from this study. Your name and email address will be collected in order for the payment (a \$15 gift card for either Starbucks or Amazon – depending on your choice) to be processed; however, they will be kept strictly confidential and will NOT be stored with data from your survey. Instead, you will be assigned a participant number and only your participant number will appear with your survey responses. Only the researchers will see your individual survey responses. Your name and email address will be used only for the purpose of processing the payment.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



### **General Instructions**

A couple of questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

**Thank you for participating!**



## Task 1 - Fraud Risk Factor Task

### BACKGROUND

You are the auditor in charge of an important client for your firm, Wittim Medical Supplies, Inc. Wittim manufactures a variety of medical supplies, including test tubes, thermometers, and disposable surgical garments. The list on the following screens contains statements about Wittim that are designed to help your firm assess the risk of misstatements arising from fraudulent financial reporting. The list was prepared by a staff member of your audit team. Your task is to group the statements into broad categories of risk factors so that each category of risk factors can subsequently be evaluated. In line with PCAOB Standards (AU Section 316), your firm categorizes risk factors into three broad categories.

The three categories are defined as follows:

1. **Incentives/Pressures:** Risk factors associated with pressures or motives that might entice management to perpetrate a dishonest or fraudulent act.
2. **Opportunities:** Risk factors associated with circumstances which would permit management to perpetrate a dishonest or fraudulent act.
3. **Attitudes/Rationalizations:** Risk factors indicative of an internal characteristic, personality trait, or set of ethical values, that might lead management to knowingly and intentionally commit a dishonest act, or rationalize such behavior.

Please consider carefully the implications of each of the following 30 statements and assign each statement to one of the above listed categories. Note that all statements relate to one of the three categories even though some statements suggest low risk (rather than heightened or normal risk) within its respective category. If you believe that a statement is ambiguous, please select the closest matching category.





	Incentives / Pressures	Opportunities	Attitudes / Rationalizations
1. There is no evidence that Wittim's audit committee oversight over the financial reporting process and internal control is ineffective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Wittim faces a high degree of competition, accompanied by declining margins.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Wittim's management does not display domineering behavior in dealing with our firm and does not seem to attempt to influence the scope of our audit work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Wittim's assets and revenues are based on significant estimates that involve subjective judgments or uncertainties that are difficult to corroborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Wittim's internal control components seem slightly deficient due to inadequate monitoring of automated controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim's management has occasionally failed to correct known reportable conditions on a timely basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim's management may have created high expectations for analysts and institutional investors through overly optimistic press releases.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Significant declines in customer demand and increasing business failures in Wittim's industry are not evident.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim's management does not impose unreasonable demands on our firm (e.g., no unreasonable time constraints regarding the completion of the audit).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Wittim holds several bank accounts in tax-haven jurisdictions for which there appears to be no clear business justification.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. There is some evidence that Wittim's nonfinancial management is excessively preoccupied with the selection of accounting principles and the determination of significant estimates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Wittim maintains an overly complex organizational structure involving unusual managerial lines of authority.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. There is no evidence that Wittim's management is dominated by a single person without compensating controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Overall, Wittim seems to have effective accounting and information systems in place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Wittim's management has a moderate financial interest in the company.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Incentives / Pressures	Opportunities	Attitudes / Rationalizations
16. Wittim's management seems overly committed to analysts with respect to achieving unrealistic forecasts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Wittim's management seems somewhat interested in employing inappropriate means to minimize reported earnings for tax-motivated reasons.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Wittim's management seems only moderately effective in communicating and enforcing the company's values and ethical standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Wittim's operating personnel feels moderately pressured to meet financial targets set up by the board of directors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Wittim's products are moderately vulnerable to rapid changes in technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Wittim needs to obtain additional debt or equity financing to stay competitive and to finance major research and development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Wittim's management shows excessive interest in increasing the company's earnings trend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Wittim engages in significant related-party transactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Wittim has a high turnover of board members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Wittim displays a marginal ability to meet exchange listing requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. Wittim is not subject to new regulatory requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. There is some evidence of recurring attempts by Wittim's management to justify marginal or inappropriate accounting on the basis of materiality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. Wittim has high turnover rates among information technology staff.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. Wittim has no known history of violations of securities laws or other laws and regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. The threat of a hostile takeover is not imminent since Wittim does not report operating losses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Task 2 - Accounts Receivable Task**

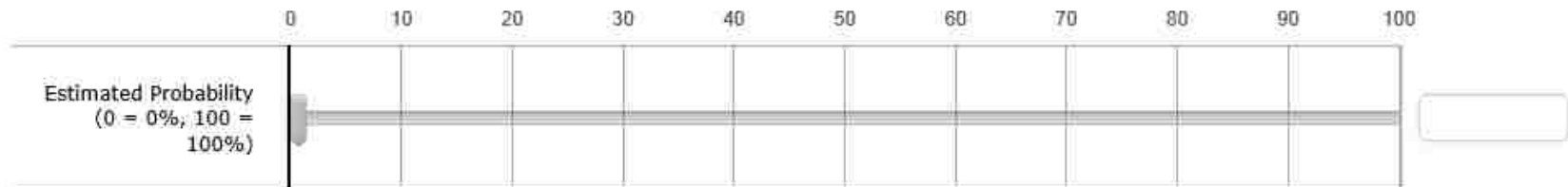
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

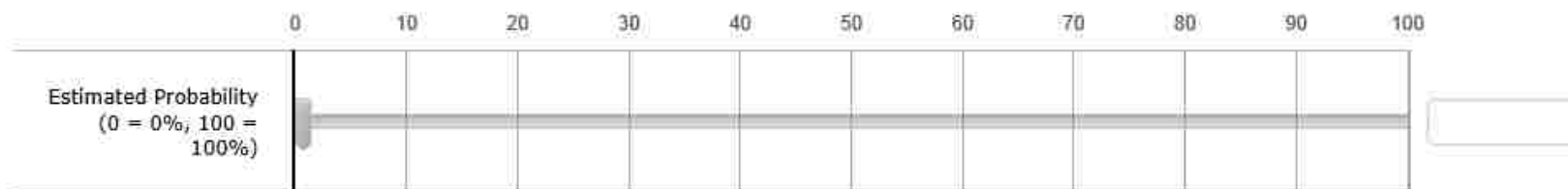
- 1. Based on the above information, what is your estimate of the probability that the receivable will be uncollectible next year?



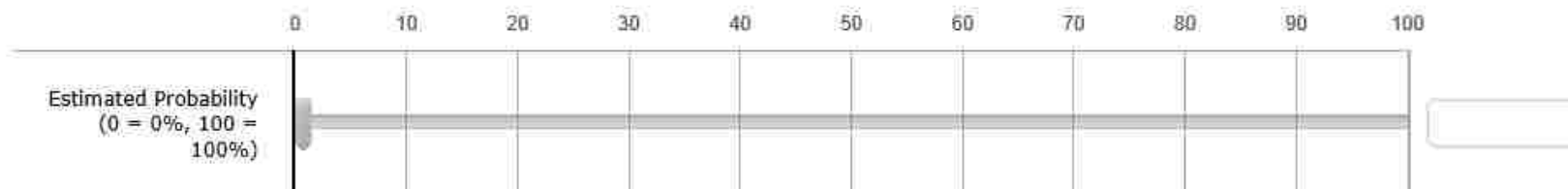
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

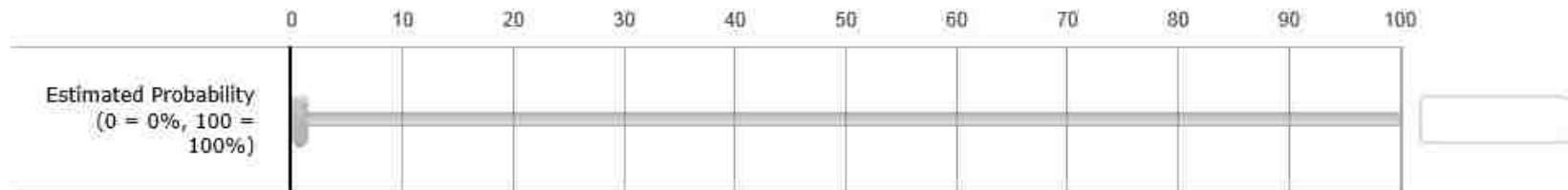
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



The two preceding tasks ("Fraud Risk Factor Task" and "Accounts Receivable Task") were related to the same audit client.

- True
- False



**What is your favorite color?**

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't read questions carefully. If you read this question and have read all the other questions, please select the box marked "other" and type "effort" (do not type the quotation marks) in the box below.

Thank you for participating and taking the time to read carefully!

- Red
- Green
- Blue
- Other (fill-in-the-blank box provided)



While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>





With the above definitions of **“Abstract Thinking”** and **“Concrete Thinking”** in mind, think back to the **Fraud Risk Factor Task** you completed (client “Wittim”) prior to the Accounts Receivable Task (client “Premier Electro Tech”). What type of thinking did the **Fraud Risk Factor Task** require?

- Abstract Thinking
- Concrete Thinking

How easy or difficult was the **Fraud Risk Factor Task** (Task 1 - related to client “Wittim”)?

Very easy

Easy

Neither easy nor difficult

Difficult

Very Difficult

Have you ever served as a member of an audit team in which you had to make an **assessment of likelihood** similar to the **Accounts Receivable Task** (Task 2 – related to client “Premier Electro Tech”) was made?

- Yes
- No





What is your age?

What is your gender?

- Male
- Female

How many years of audit experience do you have?

Which title best describes your position within your firm?

- Staff auditor
- Senior auditor
- Audit manager
- Audit director
- Audit partner

Which of the following best describes your firm?

- Big 4
- International
- National
- Regional
- Local

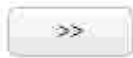
If you have recently left public accounting, how many months ago did you leave your firm? (please leave blank if not applicable)

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CA
- CIA
- CMA
- CPA
- None



**Thank you for your participation! You will now be redirected to another screen where you can enter your information to receive your \$15 gift card. PAYMENT WILL BE PROCESSED WITHIN 10 DAYS.**



**We thank you for your time spent taking this survey.**

**PLEASE SELECT THE CHOICE OF YOUR \$15 PAYMENT**

- Starbucks gift card
- Amazon gift card

**What is your name (First, Last)?**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**

**What is your email address? (Please use a personal email address to avoid corporate spam filters blocking payment)**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey. Your responses have been recorded.  
You will receive payment within the next 10 days. The gift card will be emailed to the email address you provided.



Condition 3: Concrete / Event

Do you have at least 2 years' of audit experience?

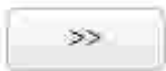
Yes

No

Are you currently working in public accounting?

Yes

No



**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task provides you with some background information about a hypothetical audit client and asks you to render decisions about various statements and their relation to fraud risk. The second task provides you with some background information about another hypothetical audit client and asks you to render several probability estimates. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary. Your responses will be confidential, your name will not be associated in any way with your responses, and only aggregated data will be included in any publications or presentations resulting from this study. Your name and email address will be collected in order for the payment (a \$15 gift card for either Starbucks or Amazon – depending on your choice) to be processed; however, they will be kept strictly confidential and will NOT be stored with data from your survey. Instead, you will be assigned a participant number and only your participant number will appear with your survey responses. Only the researchers will see your individual survey responses. Your name and email address will be used only for the purpose of processing the payment.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



### **General Instructions**

A couple of questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

**Thank you for participating!**



## Task 1 - Fraud Risk Factor Task

### BACKGROUND

You are the senior in charge of an important client for your firm, Wittim Medical Supplies, Inc. Wittim manufactures a variety of medical supplies, including test tubes, thermometers, and disposable surgical garments. The list on the following screens contains statements about Wittim that are designed to help your firm assess the risk of misstatements arising from fraudulent financial reporting. The list was prepared by a staff member of your audit team. Your task is to assess the implications of each statement with respect to its impact on its respective risk category. In line with PCAOB Standards (AU Section 316), your firm categorizes risk factors into three broad categories.

The three categories are defined as follows:

1. **Incentives/Pressures:** Risk factors associated with pressures or motives that might entice management to perpetrate a dishonest or fraudulent act.
2. **Opportunities:** Risk factors associated with circumstances which would permit management to perpetrate a dishonest or fraudulent act.
3. **Attitudes/Rationalizations:** Risk factors indicative of an internal characteristic, personality trait, or set of ethical values, that might lead management to knowingly and intentionally commit a dishonest act, or rationalize such behavior.

Please consider carefully *how* the information contained in each of the following 30 statements affects your assessment of risk related to the respective risk category. Even if a statement does not indicate the presence of a risk within its respective category, indicate the impact of the statement on its respective risk category.

>>



How is the risk of misstatements arising from fraudulent financial reporting attributable to **incentives/pressures** faced by management affected by each of the following statements?

	<b>Substantially Decreases</b>	<b>Slightly Decreases</b>	<b>No Effect</b>	<b>Slightly Increases</b>	<b>Substantially Increases</b>
1. Wittim faces a high degree of competition, accompanied by declining margins.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Wittim's products are moderately vulnerable to rapid changes in technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Significant declines in customer demand and increasing business failures in Wittim's industry are not evident.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The threat of a hostile takeover is not imminent since Wittim does not report operating losses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Wittim is not subject to new regulatory requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim's management may have created high expectations for analysts and institutional investors through overly optimistic press releases.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim needs to obtain additional debt or equity financing to stay competitive and to finance major research and development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Wittim displays a marginal ability to meet exchange listing requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim's management has a moderate financial interest in the company.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Wittim's operating personnel feels moderately pressured to meet financial targets set up by the board of directors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



How is the risk of misstatements arising from fraudulent financial reporting attributable to **opportunities** faced by management affected by each of the following statements?

	Substantially Decreases	Slightly Decreases	No Effect	Slightly Increases	Substantially Increases
1. Wittim engages in significant related-party transactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Wittim's assets and revenues are based on significant estimates that involve subjective judgments or uncertainties that are difficult to corroborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Wittim holds several bank accounts in tax-haven jurisdictions for which there appears to be no clear business justification.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. There is no evidence that Wittim's management is dominated by a single person without compensating controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. There is no evidence that Wittim's audit committee oversight over the financial reporting process and internal control is ineffective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim maintains an overly complex organizational structure involving unusual managerial lines of authority.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim has a high turnover of board members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Wittim's internal control components seem slightly deficient due to inadequate monitoring of automated controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim has high turnover rates among information technology staff.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Overall, Wittim seems to have effective accounting and information systems in place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



How is the risk of misstatements arising from fraudulent financial reporting attributable to **attitudes/rationalizations** faced by management affected by each of the following statements?

	Substantially Decreases	Slightly Decreases	No Effect	Slightly Increases	Substantially Increases
1. Wittim's management seems only moderately effective in communicating and enforcing the company's values and ethical standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. There is some evidence that Wittim's nonfinancial management is excessively preoccupied with the selection of accounting principles and the determination of significant estimates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Wittim has no known history of violations of securities laws or other laws and regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Wittim's management shows excessive interest in increasing the company's earnings trend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Wittim's management seems overly committed to analysts with respect to achieving unrealistic forecasts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim's management has occasionally failed to correct known reportable conditions on a timely basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim's management seems somewhat interested in employing inappropriate means to minimize reported earnings for tax-motivated reasons.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. There is some evidence of recurring attempts by Wittim's management to justify marginal or inappropriate accounting on the basis of materiality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim's management does not impose unreasonable demands on our firm (e.g., no unreasonable time constraints regarding the completion of the audit).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Wittim's management does not display domineering behavior in dealing with our firm and does not seem to attempt to influence the scope of our audit work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Task 2 - Accounts Receivable Task**

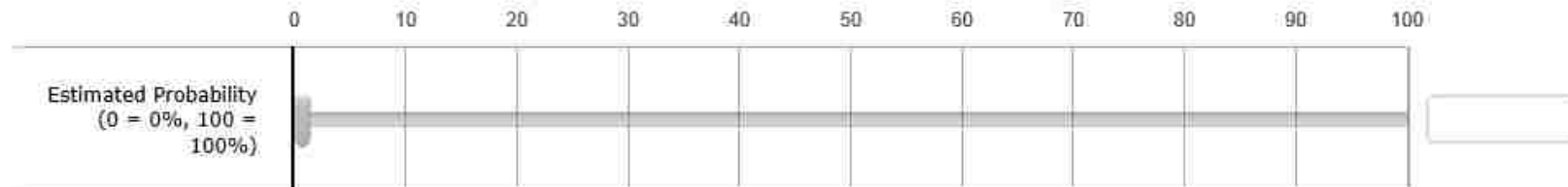
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

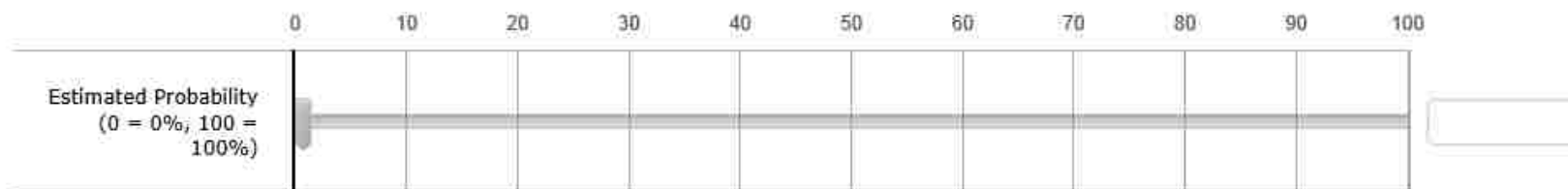
1. Based on the above information, what is your estimate of the probability that the receivable will be collectible next year?



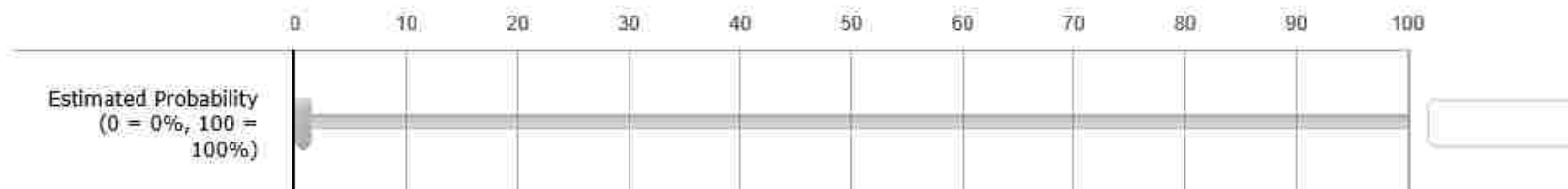
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

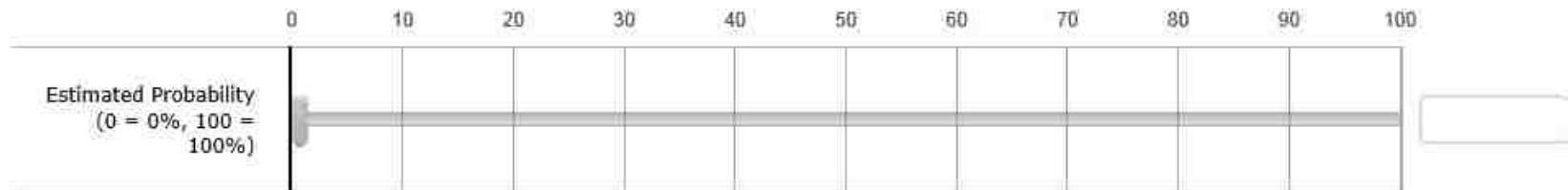
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



The two preceding tasks ("Fraud Risk Factor Task" and "Accounts Receivable Task") were related to the same audit client.

- True
- False



**What is your favorite color?**

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't read questions carefully. If you read this question and have read all the other questions, please select the box marked "other" and type "effort" (do not type the quotation marks) in the box below.

Thank you for participating and taking the time to read carefully!

- Red
- Green
- Blue
- Other (fill-in-the-blank box provided)





While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>





With the above definitions of "Abstract Thinking" and "Concrete Thinking" in mind, think back to the **Fraud Risk Factor Task** you completed (client "Wittim") prior to the Accounts Receivable Task (client "Premier Electro Tech"). What type of thinking did the **Fraud Risk Factor Task** require?

- Abstract Thinking
- Concrete Thinking

How easy or difficult was the **Fraud Risk Factor Task** (Task 1 - related to client "Wittim")?

Very easy

Easy

Neither easy nor difficult

Difficult

Very Difficult

Have you ever served as a member of an audit team in which you had to make an **assessment of likelihood** similar to the **Accounts Receivable Task** (Task 2 - related to client "Premier Electro Tech") was made?

- Yes
- No



What is your age?

What is your gender?

- Male
- Female

How many years of audit experience do you have?

Which title best describes your position within your firm?

- Staff auditor
- Senior auditor
- Audit manager
- Audit director
- Audit partner

Which of the following best describes your firm?

- Big 4
- International
- National
- Regional
- Local

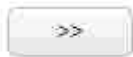
If you have recently left public accounting, how many months ago did you leave your firm? (please leave blank if not applicable)

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CA
- CIA
- CMA
- CPA
- None



**Thank you for your participation! You will now be redirected to another screen where you can enter your information to receive your \$15 gift card. PAYMENT WILL BE PROCESSED WITHIN 10 DAYS.**



**We thank you for your time spent taking this survey.**

**PLEASE SELECT THE CHOICE OF YOUR \$15 PAYMENT**

- Starbucks gift card
- Amazon gift card

**What is your name (First, Last)?**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**

**What is your email address? (Please use a personal email address to avoid corporate spam filters blocking payment)**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey. Your responses have been recorded.  
You will receive payment within the next 10 days. The gift card will be emailed to the email address you provided.

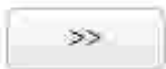
Condition 4: Concrete / Complement

Do you have at least 2 years' of audit experience?

- Yes
- No

Are you currently working in public accounting?

- Yes
- No



**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task provides you with some background information about a hypothetical audit client and asks you to render decisions about various statements and their relation to fraud risk. The second task provides you with some background information about another hypothetical audit client and asks you to render several probability estimates. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary. Your responses will be confidential, your name will not be associated in any way with your responses, and only aggregated data will be included in any publications or presentations resulting from this study. Your name and email address will be collected in order for the payment (a \$15 gift card for either Starbucks or Amazon – depending on your choice) to be processed; however, they will be kept strictly confidential and will NOT be stored with data from your survey. Instead, you will be assigned a participant number and only your participant number will appear with your survey responses. Only the researchers will see your individual survey responses. Your name and email address will be used only for the purpose of processing the payment.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



### **General Instructions**

A couple of questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

**Thank you for participating!**





## Task 1 - Fraud Risk Factor Task

### BACKGROUND

You are the senior in charge of an important client for your firm, Wittim Medical Supplies, Inc. Wittim manufactures a variety of medical supplies, including test tubes, thermometers, and disposable surgical garments. The list on the following screens contains statements about Wittim that are designed to help your firm assess the risk of misstatements arising from fraudulent financial reporting. The list was prepared by a staff member of your audit team. Your task is to assess the implications of each statement with respect to its impact on its respective risk category. In line with PCAOB Standards (AU Section 316), your firm categorizes risk factors into three broad categories.

The three categories are defined as follows:

1. **Incentives/Pressures:** Risk factors associated with pressures or motives that might entice management to perpetrate a dishonest or fraudulent act.
2. **Opportunities:** Risk factors associated with circumstances which would permit management to perpetrate a dishonest or fraudulent act.
3. **Attitudes/Rationalizations:** Risk factors indicative of an internal characteristic, personality trait, or set of ethical values, that might lead management to knowingly and intentionally commit a dishonest act, or rationalize such behavior.

Please consider carefully *how* the information contained in each of the following 30 statements affects your assessment of risk related to the respective risk category. Even if a statement does not indicate the presence of a risk within its respective category, indicate the impact of the statement on its respective risk category.

>>

How is the risk of misstatements arising from fraudulent financial reporting attributable to **incentives/pressures** faced by management affected by each of the following statements?

	<b>Substantially Decreases</b>	<b>Slightly Decreases</b>	<b>No Effect</b>	<b>Slightly Increases</b>	<b>Substantially Increases</b>
1. Wittim faces a high degree of competition, accompanied by declining margins.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Wittim's products are moderately vulnerable to rapid changes in technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Significant declines in customer demand and increasing business failures in Wittim's industry are not evident.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The threat of a hostile takeover is not imminent since Wittim does not report operating losses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Wittim is not subject to new regulatory requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim's management may have created high expectations for analysts and institutional investors through overly optimistic press releases.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim needs to obtain additional debt or equity financing to stay competitive and to finance major research and development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Wittim displays a marginal ability to meet exchange listing requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim's management has a moderate financial interest in the company.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Wittim's operating personnel feels moderately pressured to meet financial targets set up by the board of directors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



How is the risk of misstatements arising from fraudulent financial reporting attributable to **opportunities** faced by management affected by each of the following statements?

	Substantially Decreases	Slightly Decreases	No Effect	Slightly Increases	Substantially Increases
1. Wittim engages in significant related-party transactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Wittim's assets and revenues are based on significant estimates that involve subjective judgments or uncertainties that are difficult to corroborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Wittim holds several bank accounts in tax-haven jurisdictions for which there appears to be no clear business justification.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. There is no evidence that Wittim's management is dominated by a single person without compensating controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. There is no evidence that Wittim's audit committee oversight over the financial reporting process and internal control is ineffective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim maintains an overly complex organizational structure involving unusual managerial lines of authority.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim has a high turnover of board members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Wittim's internal control components seem slightly deficient due to inadequate monitoring of automated controls.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim has high turnover rates among information technology staff.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Overall, Wittim seems to have effective accounting and information systems in place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



How is the risk of misstatements arising from fraudulent financial reporting attributable to **attitudes/rationalizations** faced by management affected by each of the following statements?

	Substantially Decreases	Slightly Decreases	No Effect	Slightly Increases	Substantially Increases
1. Wittim's management seems only moderately effective in communicating and enforcing the company's values and ethical standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. There is some evidence that Wittim's nonfinancial management is excessively preoccupied with the selection of accounting principles and the determination of significant estimates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Wittim has no known history of violations of securities laws or other laws and regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Wittim's management shows excessive interest in increasing the company's earnings trend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Wittim's management seems overly committed to analysts with respect to achieving unrealistic forecasts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Wittim's management has occasionally failed to correct known reportable conditions on a timely basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Wittim's management seems somewhat interested in employing inappropriate means to minimize reported earnings for tax-motivated reasons.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. There is some evidence of recurring attempts by Wittim's management to justify marginal or inappropriate accounting on the basis of materiality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Wittim's management does not impose unreasonable demands on our firm (e.g., no unreasonable time constraints regarding the completion of the audit).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Wittim's management does not display domineering behavior in dealing with our firm and does not seem to attempt to influence the scope of our audit work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Task 2 - Accounts Receivable Task**

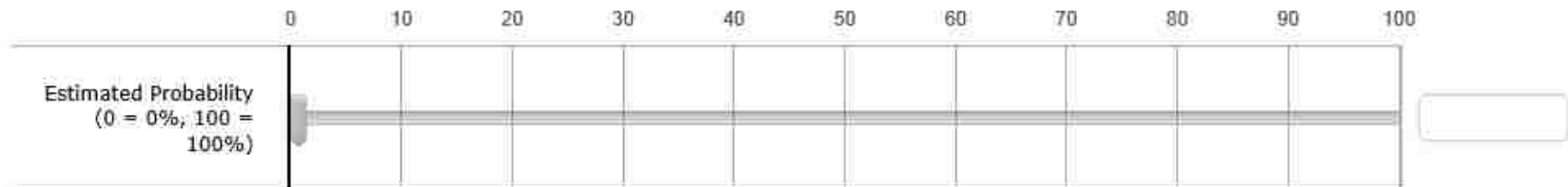
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

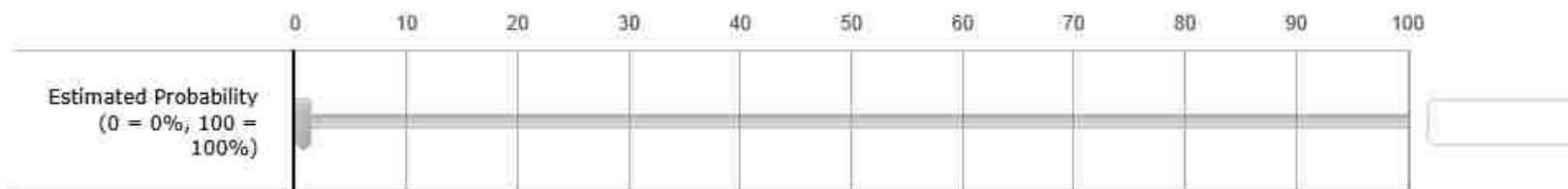
1. Based on the above information, what is your estimate of the probability that the receivable will be uncollectible next year?



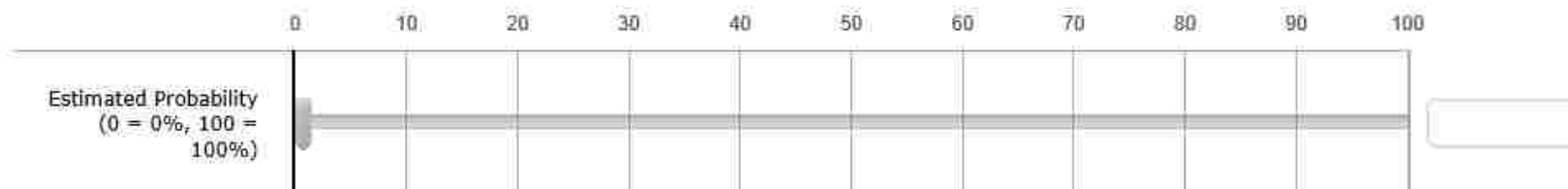
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

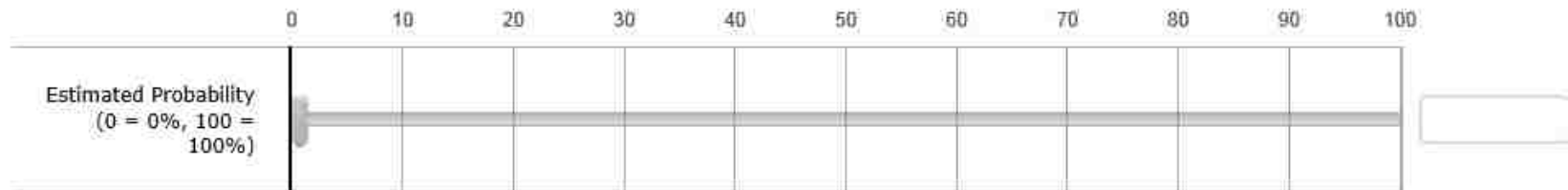
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



The two preceding tasks ("Fraud Risk Factor Task" and "Accounts Receivable Task") were related to the same audit client.

- True
- False



**What is your favorite color?**

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't read questions carefully. If you read this question and have read all the other questions, please select the box marked "other" and type "effort" (do not type the quotation marks) in the box below.

Thank you for participating and taking the time to read carefully!

- Red
- Green
- Blue
- Other (fill-in-the-blank box provided)





While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>



With the above definitions of **“Abstract Thinking”** and **“Concrete Thinking”** in mind, think back to the **Fraud Risk Factor Task** you completed (client “Wittim”) prior to the Accounts Receivable Task (client “Premier Electro Tech”). What type of thinking did the **Fraud Risk Factor Task** require?

- Abstract Thinking
- Concrete Thinking

How easy or difficult was the **Fraud Risk Factor Task** (Task 1 - related to client “Wittim”)?

Very easy

Easy

Neither easy nor difficult

Difficult

Very Difficult

Have you ever served as a member of an audit team in which you had to make an **assessment of likelihood** similar to the **Accounts Receivable Task** (Task 2 – related to client “Premier Electro Tech”) was made?

- Yes
- No



What is your age?

What is your gender?

- Male
- Female

How many years of audit experience do you have?

Which title best describes your position within your firm?

- Staff auditor
- Senior auditor
- Audit manager
- Audit director
- Audit partner

Which of the following best describes your firm?

- Big 4
- International
- National
- Regional
- Local

If you have recently left public accounting, how many months ago did you leave your firm? (please leave blank if not applicable)

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CA
- CIA
- CMA
- CPA
- None



**Thank you for your participation! You will now be redirected to another screen where you can enter your information to receive your \$15 gift card. PAYMENT WILL BE PROCESSED WITHIN 10 DAYS.**



**We thank you for your time spent taking this survey.**

**PLEASE SELECT THE CHOICE OF YOUR \$15 PAYMENT**

- Starbucks gift card
- Amazon gift card

**What is your name (First, Last)?**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**

**What is your email address? (Please use a personal email address to avoid corporate spam filters blocking payment)**

**FOR PAYMENT PROCESSING PURPOSES ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey. Your responses have been recorded.  
You will receive payment within the next 10 days. The gift card will be emailed to the email address you provided.



**APPENDIX B: STUDY 2 – EXPERIMENT 2:  
CASES AND QUESTIONNAIRE**

## Condition 1: Abstract / Event

**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task is a sentence completion task involving categories and examples. The second task provides you with some background information about a hypothetical audit client and asks you to render a probability estimate about the client's ability to collect a customer's outstanding accounts receivable balance in full. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.





**Task 1 - Thought Exercise**

This task is an exercise having to do with thinking about categories and examples. In each question below, you will be provided with an example of some category and will be asked to identify a broader category that the item belongs to.

For example:

<p>Example 1: A <i>SKYSCRAPER</i> is an example of what? Possible answer: building</p> <p>Example 2: A <i>GUITAR</i> is an example of what? Possible answer: musical instrument</p>
---

Please complete the following list according to your daily perception. There are no right or wrong answers for the questions.

An **ACTOR** is an example of what?

A **BEER** is an example of what?

A **BOOK** is an example of what?

A **CANDY** is an example of what?

A **COIN** is an example of what?

A **COLLEGE** is an example of what?

A **COMPUTER** is an example of what?

A **DANCE** is an example of what?

A **GAME** is an example of what?

A **KING** is an example of what?

**LUNCH** is an example of what?

**MAIL** is an example of what?

**MATH** is an example of what?

A **MOUNTAIN** are an example of what?

A **MOVIE** is an example of what?

A **NEWSPAPER** is an example of what?

A **PAINTING** is an example of what?

**PASTA** is an example of what?

A **PHONE** is an example of what?

A **PROFESSOR** is an example of what?

A **RESTAURANT** is an example of what?

A **RIVER** is an example of what?

A **SENATOR** is an example of what?

A **SHOE** is an example of what?

A **SINGER** is an example of what?

A **SOAP OPERA** is an example of what?

A **SODA** is an example of what?

A **SPORT** is an example of what?

A **TREE** is an example of what?

A **WHALE** is an example of what?

>>

**Task 2 - Accounts Receivable Task**

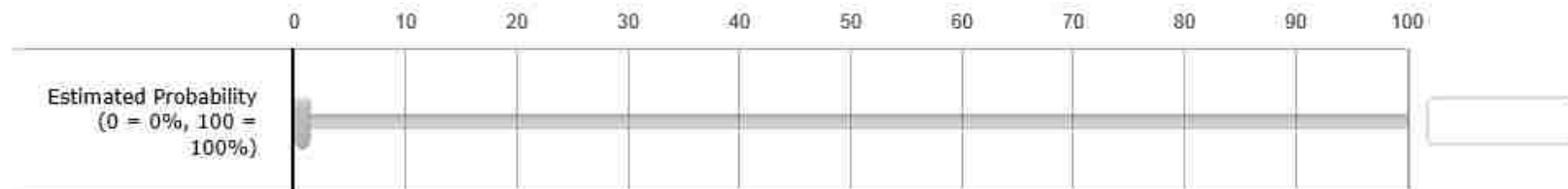
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

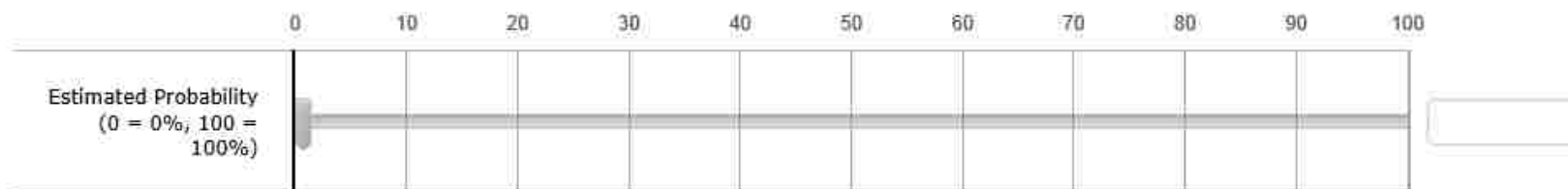
1. Based on the above information, what is your estimate of the probability that the receivable will be collectible next year?



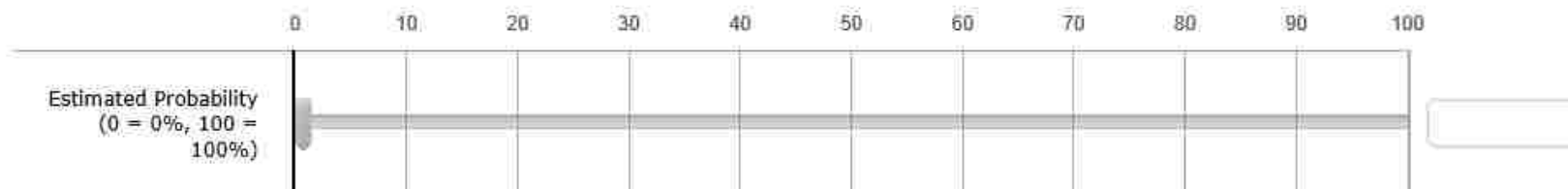
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

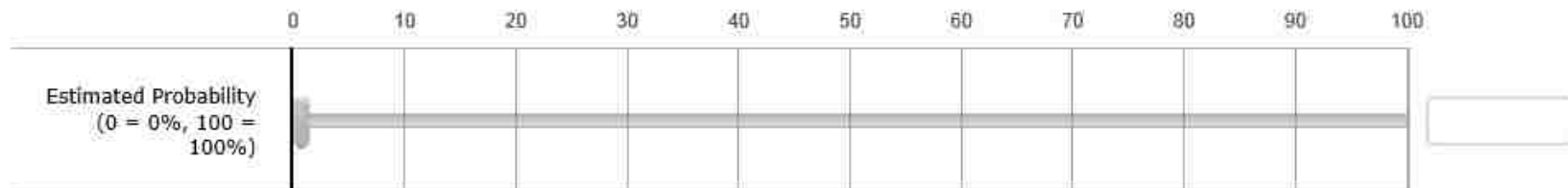
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>



What is your age?

What is your gender?

- Male
- Female

Have you taken an audit class or are you currently taking an audit class?

- Yes
- No

How much audit experience (include internships) do you have? (e.g., 3 months)

How many years of non-audit work experience do you have? (e.g., 2 years 4 months)

Do you plan to work as an auditor upon graduation?

- Yes
- No
- Don't know

**Thank you for your participation! You will now be redirected to another screen where you can enter your name and course section so that your instructor becomes aware of your help with this study.**





**What is your name (First, Last)?**

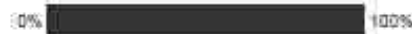
**FOR YOUR INSTRUCTOR ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA.**

**Please enter your Class Number and Section Number so that your instructor can identify you and note your help with this study (e.g., ACG 4651 -0005)**

**ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey.  
Your response has been recorded.



## Condition 2: Abstract / Complement

**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task is a sentence completion task involving categories and examples. The second task provides you with some background information about a hypothetical audit client and asks you to render a probability estimate about the client's ability to collect a customer's outstanding accounts receivable balance in full. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



**Task 1 - Thought Exercise**

This task is an exercise having to do with thinking about categories and examples. In each question below, you will be provided with an example of some category and will be asked to identify a broader category that the item belongs to.

For example:

<p>Example 1: A <b>SKYSCRAPER</b> is an example of what? Possible answer: building</p> <p>Example 2: A <b>GUITAR</b> is an example of what? Possible answer: musical instrument</p>
---

Please complete the following list according to your daily perception. There are no right or wrong answers for the questions.

An <b>ACTOR</b> is an example of what?	<input type="text"/>
A <b>BEER</b> is an example of what?	<input type="text"/>
A <b>BOOK</b> is an example of what?	<input type="text"/>
A <b>CANDY</b> is an example of what?	<input type="text"/>
A <b>COIN</b> is an example of what?	<input type="text"/>
A <b>COLLEGE</b> is an example of what?	<input type="text"/>
A <b>COMPUTER</b> is an example of what?	<input type="text"/>
A <b>DANCE</b> is an example of what?	<input type="text"/>
A <b>GAME</b> is an example of what?	<input type="text"/>
A <b>KING</b> is an example of what?	<input type="text"/>

**LUNCH** is an example of what?

**MAIL** is an example of what?

**MATH** is an example of what?

A **MOUNTAIN** are an example of what?

A **MOVIE** is an example of what?

A **NEWSPAPER** is an example of what?

A **PAINTING** is an example of what?

**PASTA** is an example of what?

A **PHONE** is an example of what?

A **PROFESSOR** is an example of what?

A **RESTAURANT** is an example of what?

A **RIVER** is an example of what?

A **SENATOR** is an example of what?

A **SHOE** is an example of what?

A **SINGER** is an example of what?

A **SOAP OPERA** is an example of what?

A **SODA** is an example of what?

A **SPORT** is an example of what?

A **TREE** is an example of what?

A **WHALE** is an example of what?



**Task 2 - Accounts Receivable Task**

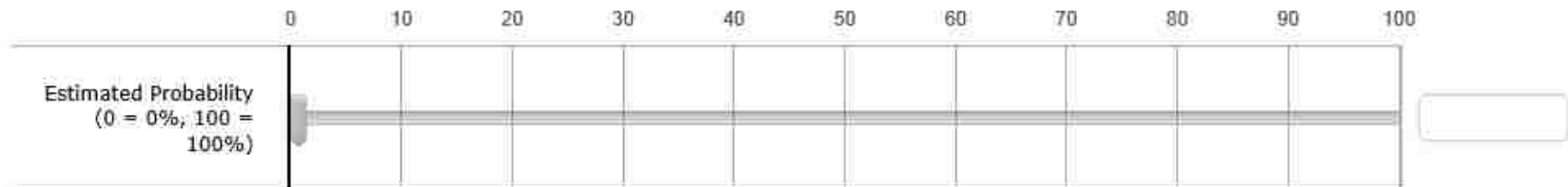
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

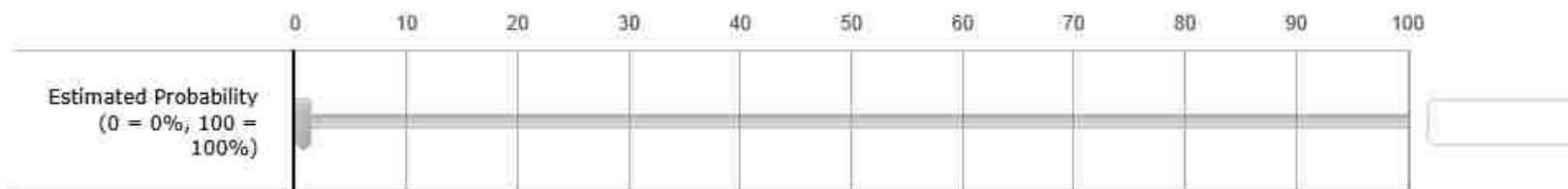
1. Based on the above information, what is your estimate of the probability that the receivable will be uncollectible next year?



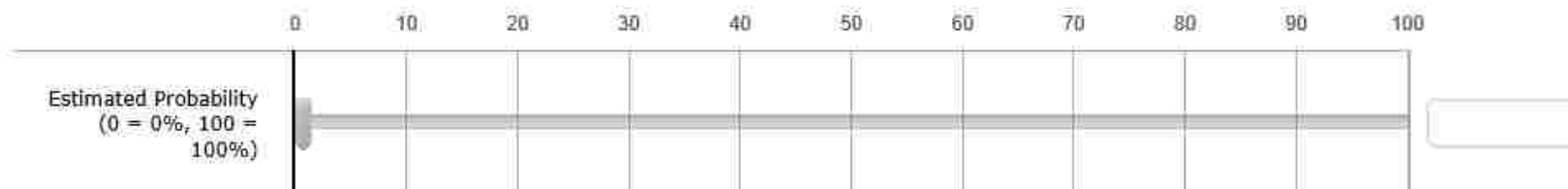
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

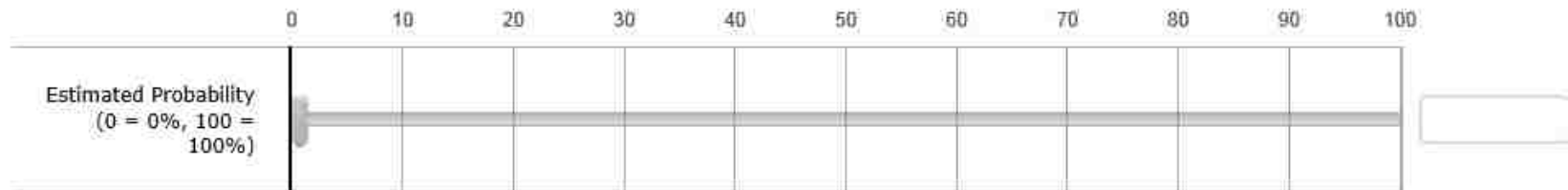
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	Abstract Thinking	Concrete Thinking
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>





What is your age?

What is your gender?

- Male
- Female

Have you taken an audit class or are you currently taking an audit class?

- Yes
- No

How much audit experience (include internships) do you have? (e.g., 3 months)

How many years of non-audit work experience do you have? (e.g., 2 years 4 months)

Do you plan to work as an auditor upon graduation?

- Yes
- No
- Don't know

**Thank you for your participation! You will now be redirected to another screen where you can enter your name and course section so that your instructor becomes aware of your help with this study.**



**What is your name (First, Last)?**

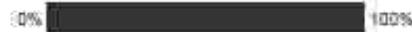
**FOR YOUR INSTRUCTOR ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA.**

**Please enter your Class Number and Section Number so that your instructor can identify you and note your help with this study (e.g., ACG 4651 -0005)**

**ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey.  
Your response has been recorded.



### Condition 3: Concrete / Event

**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task is a sentence completion task involving categories and examples. The second task provides you with some background information about a hypothetical audit client and asks you to render a probability estimate about the client's ability to collect a customer's outstanding accounts receivable balance in full. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



### Task 1 - Thought Exercise

This task is an exercise having to do with thinking about categories and examples. In each question below, you will be provided with a category and will be asked to provide an example of something that belongs to it.

For example:

<p>Example 1: An example of a <b>SKYSCRAPER</b> is what? Possible answer: Empire State Building</p> <p>Example 2: An example of a <b>MUSICAL INSTRUMENT</b> is what? Possible answer: guitar</p>
--

Please complete the following list according to your daily perception. There are no right or wrong answers for the questions.

An example of an **ACTOR** is what?

An example of a **BEER** is what?

An example of a **BOOK** is what?

An example of a **CANDY** is what?

An example of a **COIN** is what?

An example of a **COLLEGE** is what?

An example of a **COMPUTER** is what?

An example of a **DANCE** is what?

An example of a **GAME** is what?

An example of a **KING** is what?

An example of **LUNCH** is what?

An example of **MAIL** is what?

An example of **MATH** is what?

An example of a **MOUNTAIN** is what?

An example of a **MOVIE** is what?

An example of a **NEWSPAPER** is what?

An example of a **PAINTING** is what?

An example of **PASTA** is what?

An example of a **PHONE** is what?

An example of a **PROFESSOR** is what?

An example of a **RESTAURANT** is what?

An example of a **RIVER** is what?

An example of a **SENATOR** is what?

An example of a **SHOE** is what?

An example of a **SINGER** is what?

An example of a **SOAP OPERA** is what?

An example of a **SODA** is what?

An example of a **SPORT** is what?

An example of a **TREE** is what?

An example of a **WHALE** is what?



**Task 2 - Accounts Receivable Task**

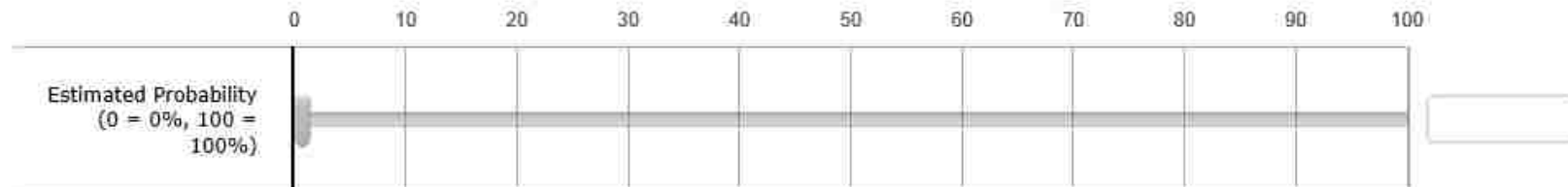
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

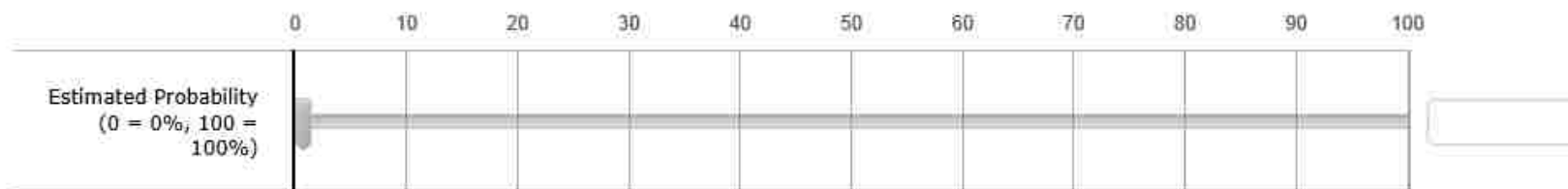
1. Based on the above information, what is your estimate of the probability that the receivable will be collectible next year?



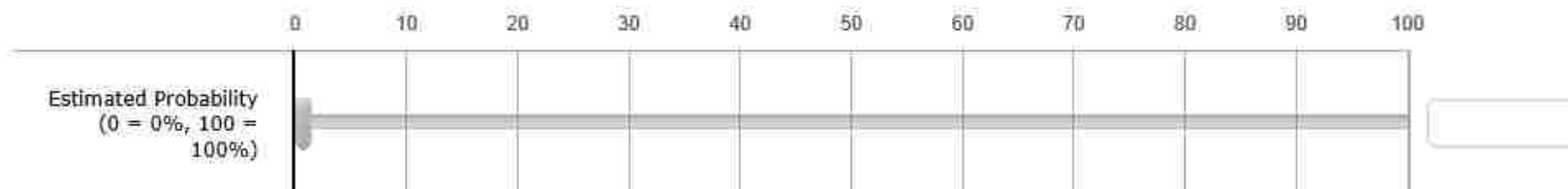
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?

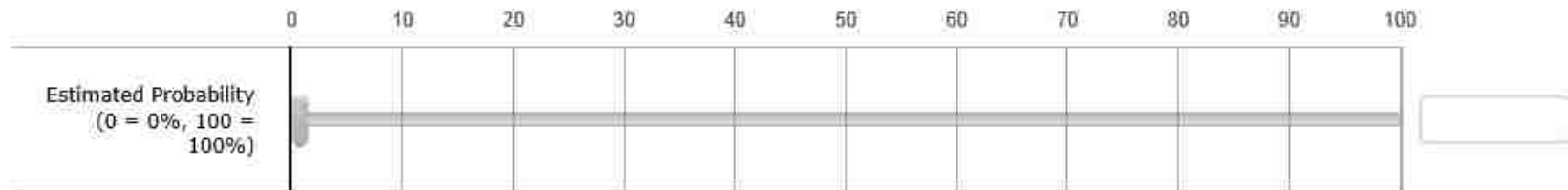


4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?





5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>



What is your age?

What is your gender?

- Male
- Female

Have you taken an audit class or are you currently taking an audit class?

- Yes
- No

How much audit experience (include internships) do you have? (e.g., 3 months)

How many years of non-audit work experience do you have? (e.g., 2 years 4 months)

Do you plan to work as an auditor upon graduation?

- Yes
- No
- Don't know

**Thank you for your participation! You will now be redirected to another screen where you can enter your name and course section so that your instructor becomes aware of your help with this study.**



**What is your name (First, Last)?**

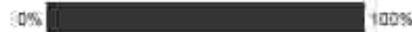
**FOR YOUR INSTRUCTOR ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA.**

**Please enter your Class Number and Section Number so that your instructor can identify you and note your help with this study (e.g., ACG 4651 -0005)**

**ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey.  
Your response has been recorded.



## Condition 4: Concrete / Complement

**Title of Project:** Auditors' Decision-Making

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 15 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about auditors' judgment and decision-making processes.

The study consists of two tasks. The first task is a sentence completion task involving categories and examples. The second task provides you with some background information about a hypothetical audit client and asks you to render a probability estimate about the client's ability to collect a customer's outstanding accounts receivable balance in full. You will also be asked several demographic questions. As the results of this study could be helpful to audit firms, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.



### Task 1 - Thought Exercise

This task is an exercise having to do with thinking about categories and examples. In each question below, you will be provided with a category and will be asked to provide an example of something that belongs to it.

For example:

<p>Example 1: An example of a <b>SKYSCRAPER</b> is what? Possible answer: Empire State Building</p> <p>Example 2: An example of a <b>MUSICAL INSTRUMENT</b> is what? Possible answer: guitar</p>
--

Please complete the following list according to your daily perception. There are no right or wrong answers for the questions.

An example of an **ACTOR** is what?

An example of a **BEER** is what?

An example of a **BOOK** is what?

An example of a **CANDY** is what?

An example of a **COIN** is what?

An example of a **COLLEGE** is what?

An example of a **COMPUTER** is what?

An example of a **DANCE** is what?

An example of a **GAME** is what?

An example of a **KING** is what?

An example of **LUNCH** is what?

An example of **MAIL** is what?

An example of **MATH** is what?

An example of a **MOUNTAIN** is what?

An example of a **MOVIE** is what?

An example of a **NEWSPAPER** is what?

An example of a **PAINTING** is what?

An example of **PASTA** is what?

An example of a **PHONE** is what?

An example of a **PROFESSOR** is what?

An example of a **RESTAURANT** is what?

An example of a **RIVER** is what?

An example of a **SENATOR** is what?

An example of a **SHOE** is what?

An example of a **SINGER** is what?

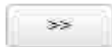
An example of a **SOAP OPERA** is what?

An example of a **SODA** is what?

An example of a **SPORT** is what?

An example of a **TREE** is what?

An example of a **WHALE** is what?





**Task 2 - Accounts Receivable Task**

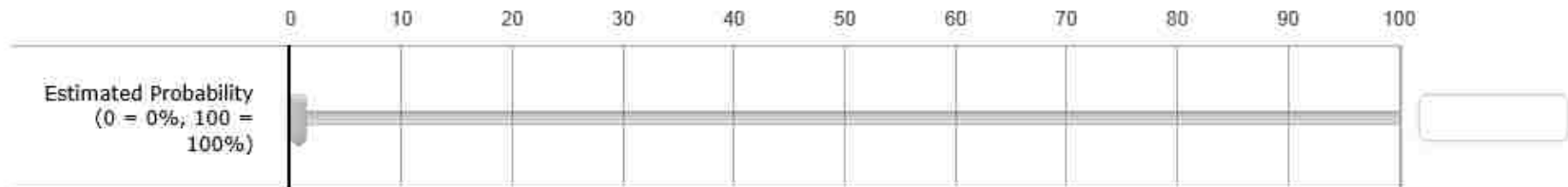
**BACKGROUND**

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that the company has been able to collect receivables that are 6 months past due about half of the time. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

**For each of the following four questions, use the sliding scale to indicate your assessment.**

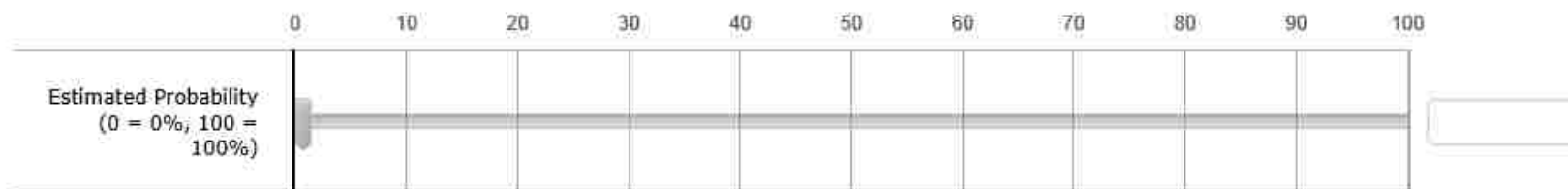
- 1. Based on the above information, what is your estimate of the probability that the receivable will be uncollectible next year?



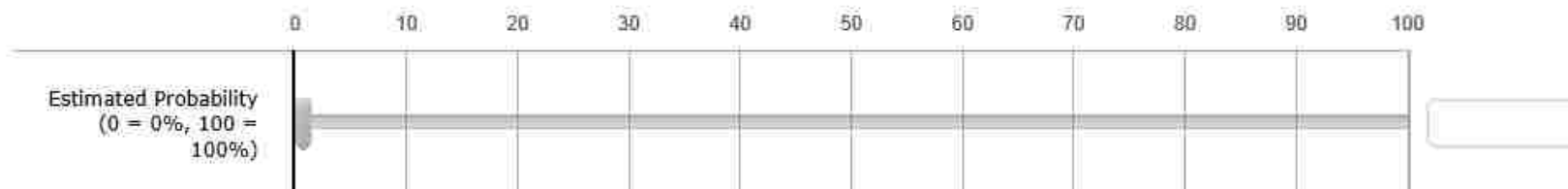
2. Given your knowledge of Premier Electro Tech and the explanation provided by the company's credit manager do you believe that the accounts receivable balance is materially misstated?

- Yes
- No

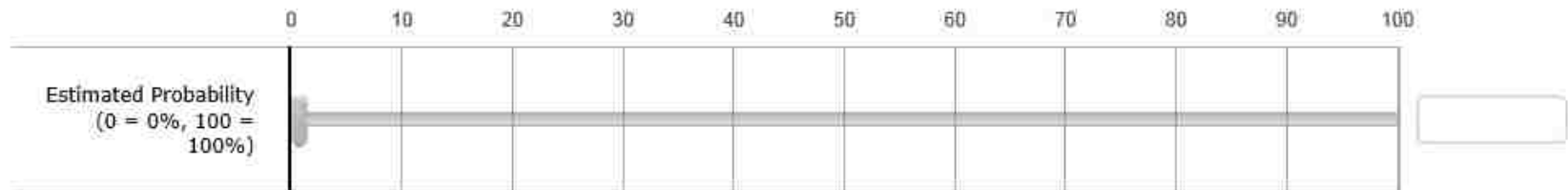
3. What is your estimate of the probability that the controller of Premier Electro Tech will try to overstate collectibles?



4. What is your estimate of the probability that the "new computerized accounting system" installed by Premier Electro Tech's customer will work as expected?



5. What is your estimate of the probability that the PCAOB will issue new guidance related to audit procedures concerning the collectability of receivables?



While auditors conduct numerous tasks that require them to be very detail-oriented, they also perform tasks that require them to see the 'big picture'. In other words, auditors also render judgments related to tasks that require them to 'step back' from the specifics and to think more broadly.

Thinking broadly and to focus on the 'big picture' is also referred to as "**Abstract Thinking**" while detail-oriented thinking is referred to as "**Concrete Thinking**".

Based on those definitions, please indicate the type of thinking (**Abstract Thinking** or **Concrete Thinking**) required by the following 10 audit tasks:

	<b>Abstract Thinking</b>	<b>Concrete Thinking</b>
1) Deciding whether an audit client's decision to acquire real estate for development in the year 2020 exposes the audit client to additional risks.	<input type="radio"/>	<input type="radio"/>
2) Observing and documenting how client personnel conduct an inventory count.	<input type="radio"/>	<input type="radio"/>
3) Checking the mathematical accuracy of client records (e.g., recalculating depreciation expense based on a fixed asset rollforward schedule).	<input type="radio"/>	<input type="radio"/>
4) Choosing a sample of employees and recalculating net pay using proper payroll tax rates and authorized deductions.	<input type="radio"/>	<input type="radio"/>
5) Identifying a set of companies with similar characteristics to an audit client with several business segments for purposes of developing expectations for analytical procedures.	<input type="radio"/>	<input type="radio"/>
6) Inspecting client-provided source documents and records for proper authorization (e.g., verifying signatures on checks).	<input type="radio"/>	<input type="radio"/>
7) Evaluating the implications of unexpected fluctuations in one of the audit client's business segments on the client's overall ability to continue as a going concern.	<input type="radio"/>	<input type="radio"/>
8) Reflecting on the implications of an audit client's decision to enter a foreign market through direct investment with respect to the client's ability to continue as a going concern (e.g., a U.S. based audit client takes a majority stake in a Chinese company).	<input type="radio"/>	<input type="radio"/>
9) Obtaining a better understanding of an audit client's business strategy by reflecting on the overarching goal of the client's decision to enter into a joint venture that is not clearly related to the audit client's existing business.	<input type="radio"/>	<input type="radio"/>
10) Conducting an inventory count at a client warehouse.	<input type="radio"/>	<input type="radio"/>



What is your age?

What is your gender?

- Male
- Female

Have you taken an audit class or are you currently taking an audit class?

- Yes
- No

How much audit experience (include internships) do you have? (e.g., 3 months)

How many years of non-audit work experience do you have? (e.g., 2 years 4 months)

Do you plan to work as an auditor upon graduation?

- Yes
- No
- Don't know

**Thank you for your participation! You will now be redirected to another screen where you can enter your name and course section so that your instructor becomes aware of your help with this study.**



**What is your name (First, Last)?**

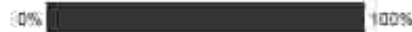
**FOR YOUR INSTRUCTOR ONLY - ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA.**

**Please enter your Class Number and Section Number so that your instructor can identify you and note your help with this study (e.g., ACG 4651 -0005)**

**ANSWERS WILL NOT BE STORED WITH YOUR SURVEY DATA**



We thank you for your time spent taking this survey.  
Your response has been recorded.



**APPENDIX C: STUDY 3 – EXPERIMENT 1:  
CASES AND QUESTIONNAIRE**



## Condition 1 – Likely Risk

### **Research Study Materials**

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 10 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about risk managers' judgment and decision-making processes.

The study provides you with some background information about a hypothetical company and asks you to assume the role of a risk manager for this company. You will then be asked to render judgments about the occurrence of specific risks. Questions about your understanding of the case material and demographic questions are asked at the end of the survey. As the results of this study could be helpful to risk management practice, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at [sgsutton@ucf.edu](mailto:sgsutton@ucf.edu). Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or [irb@mail.ucf.edu](mailto:irb@mail.ucf.edu) (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

## BACKGROUND

Assume you and your family have lived in Orlando, FL for the last 10 years. A few years ago, you accepted a risk management position with ABC Company, a company that is also located in Orlando, FL. Since you started your job with Orlando-based ABC, you have been promoted several times and you are now the leader of a corporate team in charge of risk management. You and your entire team are based at ABC's headquarter in Orlando, FL, not far from where you live.

ABC is a publicly traded electronic equipment manufacturer that sells its products in over 80 countries. The company operates subsidiaries across the globe and has recently established two additional subsidiaries. One of the subsidiaries is located in Lake Mary, FL less than 20 miles from ABC's headquarter; the other subsidiary is located in Minneapolis, MN, around 1,600 miles from ABC's headquarter. The operations of both subsidiaries are considered temporary (15-year) projects that are expected to contribute significant to ABC's bottom line. Both subsidiaries specialize in different, but equally profitable product lines in the customized robotic surgery tools industry.

Your team is in the early stages of developing a formal risk management process for ABC's newly established Lake Mary-based and Minneapolis-based subsidiaries. As part of this process, your team has to consider the occurrence of various risks that - if they occur - have a significant negative impact on the operations and financial success of the subsidiaries (and thus on ABC). In line with professional guidelines, your team ranks risk factors into five categories based on the likelihood of occurrence. The following table illustrates this framework:

Probability Descriptor	Definition
Almost certain	90% or greater chance of occurrence over life of project
Likely	65% up to 90% or greater chance of occurrence over life of project
Possible	35% up to 65% chance of occurrence over life of project
Unlikely	10% up to 35% chance of occurrence over life of project
Rare	<10% chance of occurrence over life of project

One of the risks under consideration is the risk that a massive cyber-attack leads to a prolonged interruption of a subsidiary's order processing capabilities. As a consequence, the affected subsidiary may be unable to deliver sufficient products for several months. Based on your teams' analysis, the probability that such a cyber-attack will target either subsidiary at some point during their respective project-lifetime is **less than 5%**. Accordingly, you categorize the threat of a cyber-attack as "**rare**". Further analyses reveal that the overall impact of a cyber-attack on ABC's profitability would be equally severe regardless of whether the cyber-attack targets the Lake Mary-based subsidiary or the Minneapolis-based subsidiary.

Another risk under consideration is the risk that a key supplier will be unable to meet a subsidiary's demand for supplies for a prolonged period of time. As a consequence, the affected subsidiary may be unable to deliver sufficient products for several months. Based on your teams' analysis, the probability that key supplier problems will occur and affect the product line of either subsidiary at some point during their respective project-lifetime is **at least 90%**. Accordingly, you categorize the threat of key supplier problems as **"almost certain"**. Further analyses reveal that the overall impact of key supplier problems on ABC's profitability would be equally severe regardless of whether such key supplier problems threaten the product line of the Lake Mary-based subsidiary or the product line of the Minneapolis-based subsidiary.



Source: University of Texas Libraries

**QUESTION & ANSWER CHOICES:**

Note:

You may feel that you do not have sufficient information to adequately respond to the following question. If this happens, do not worry - the study is concerned with your intuitive judgment.

Instructions:

Assume **the highly likely risk** (at least 90% chance of occurrence) **WILL EVENTUALLY materialize**. Given this assumption, please answer the following question by placing a checkmark into the appropriate box:

Where do you think the highly **likely** risk (at least 90% chance of occurrence) will materialize?

Lake Mary subsidiary

Minneapolis subsidiary

**PLEASE DO NOT LOOK BACK TO THE CASE SCENARIO WHEN ANSWERING THE FOLLOWING QUESTIONS:**

1. The scenario you just read described that you and your risk management team are located in Orlando, FL.

\_\_\_\_\_ True  
\_\_\_\_\_ False

2. The preceding scenario explained that the impact of a cyber-attack would be equally severe regardless of which subsidiary would be affected by a cyber-attack.

\_\_\_\_\_ True  
\_\_\_\_\_ False

3. The preceding scenario explained that the impact of a key supplier problem would be equally severe regardless of which subsidiary would be affected by a key supplier problem.

\_\_\_\_\_ True  
\_\_\_\_\_ False

4. Please rate your experience with risk management practices?

\_\_\_\_\_ Highly experienced (participated in many risk management projects)  
\_\_\_\_\_ Experienced (participated in a several risk management projects)  
\_\_\_\_\_ Knowledgeable (participated in at least one risk management project)  
\_\_\_\_\_ Indirect experience only (e.g., read about risk management practices;  
worked on a student project related to risk management)  
\_\_\_\_\_ No experience

## **Biographical Information**

RESPONSES TO THE FOLLOWING QUESTIONS WILL BE ANONYMOUS AND STRICTLY CONFIDENTIAL

PLEASE PROVIDE THE FOLLOWING BIOGRAPHICAL INFORMATION:

1. What is your age?

\_\_\_\_\_years

2. What is your gender?

\_\_\_\_\_Male

\_\_\_\_\_Female

3. How many years of work experience do you have?

\_\_\_\_\_years

4. Do you plan to work in an accounting, finance, or risk management position upon graduation?

\_\_\_\_\_Yes

\_\_\_\_\_No

\_\_\_\_\_Don't know

5. How long have you lived in the Orlando, FL area?

\_\_\_\_\_Years

\_\_\_\_\_Months

**Thank you for your participation!**

## Condition 2 – Unlikely Risk

### **Research Study Materials**

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take about 10 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about risk managers' judgment and decision-making processes.

The study provides you with some background information about a hypothetical company and asks you to assume the role of a risk manager for this company. You will then be asked to render judgments about the occurrence of specific risks. Questions about your understanding of the case material and demographic questions are asked at the end of the survey. As the results of this study could be helpful to risk management practice, it is important that you answer each question in a serious and thoughtful manner.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at [sgsutton@ucf.edu](mailto:sgsutton@ucf.edu). Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or [irb@mail.ucf.edu](mailto:irb@mail.ucf.edu) (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

**BACKGROUND**

Assume you and your family have lived in Orlando, FL for the last 10 years. A few years ago, you accepted a risk management position with ABC Company, a company that is also located in Orlando, FL. Since you started your job with Orlando-based ABC, you have been promoted several times and you are now the leader of a corporate team in charge of risk management. You and your entire team are based at ABC’s headquarter in Orlando, FL, not far from where you live.

ABC is a publicly traded electronic equipment manufacturer that sells its products in over 80 countries. The company operates subsidiaries across the globe and has recently established two additional subsidiaries. One of the subsidiaries is located in Lake Mary, FL less than 20 miles from ABC’s headquarter; the other subsidiary is located in Minneapolis, MN, around 1,600 miles from ABC’s headquarter. The operations of both subsidiaries are considered temporary (15-year) projects that are expected to contribute significant to ABC’s bottom line. Both subsidiaries specialize in different, but equally profitable product lines in the customized robotic surgery tools industry.

Your team is in the early stages of developing a formal risk management process for ABC’s newly established Lake Mary-based and Minneapolis-based subsidiaries. As part of this process, your team has to consider the occurrence of various risks that - if they occur - have a significant negative impact on the operations and financial success of the subsidiaries (and thus on ABC). In line with professional guidelines, your team ranks risk factors into five categories based on the likelihood of occurrence. The following table illustrates this framework:

<b>Probability Descriptor</b>	<b>Definition</b>
Almost certain	90% or greater chance of occurrence over life of project
Likely	65% up to 90% or greater chance of occurrence over life of project
Possible	35% up to 65% chance of occurrence over life of project
Unlikely	10% up to 35% chance of occurrence over life of project
Rare	<10% chance of occurrence over life of project

One of the risks under consideration is the risk that a massive cyber-attack leads to a prolonged interruption of a subsidiary’s order processing capabilities. As a consequence, the affected subsidiary may be unable to deliver sufficient products for several months. Based on your teams’ analysis, the probability that such a cyber-attack will target either subsidiary at some point during their respective project-lifetime is **less than 5%**. Accordingly, you categorize the threat of a cyber-attack as **“rare”**. Further analyses reveal that the overall impact of a cyber-attack on ABC’s profitability would be equally severe regardless of whether the cyber-attack targets the Lake Mary-based subsidiary or the Minneapolis-based subsidiary.



Another risk under consideration is the risk that a key supplier will be unable to meet a subsidiary's demand for supplies for a prolonged period of time. As a consequence, the affected subsidiary may be unable to deliver sufficient products for several months. Based on your teams' analysis, the probability that key supplier problems will occur and affect the product line of either subsidiary at some point during their respective project-lifetime is **at least 90%**. Accordingly, you categorize the threat of key supplier problems as **"almost certain"**. Further analyses reveal that the overall impact of key supplier problems on ABC's profitability would be equally severe regardless of whether such key supplier problems threaten the product line of the Lake Mary-based subsidiary or the product line of the Minneapolis-based subsidiary.



Source: University of Texas Libraries

**QUESTION & ANSWER CHOICES:**

Note:

You may feel that you do not have sufficient information to adequately respond to the following question. If this happens, do not worry - the study is concerned with your intuitive judgment.

Instructions:

Assume **the highly unlikely risk** (less than 5% chance of occurrence) **WILL EVENTUALLY materialize**. Given this assumption, please answer the following question by placing a checkmark into the appropriate box:

Where do you think the highly **unlikely** risk (less than 5% chance of occurrence) will materialize?

Lake Mary subsidiary

Minneapolis subsidiary

**PLEASE DO NOT LOOK BACK TO THE CASE SCENARIO WHEN ANSWERING THE FOLLOWING QUESTIONS:**

5. The scenario you just read described that you and your risk management team are located in Orlando, FL.

\_\_\_\_\_ True  
\_\_\_\_\_ False

6. The preceding scenario explained that the impact of a cyber-attack would be equally severe regardless of which subsidiary would be affected by a cyber-attack.

\_\_\_\_\_ True  
\_\_\_\_\_ False

7. The preceding scenario explained that the impact of a key supplier problem would be equally severe regardless of which subsidiary would be affected by a key supplier problem.

\_\_\_\_\_ True  
\_\_\_\_\_ False

8. Please rate your experience with risk management practices?

\_\_\_\_\_ Highly experienced (participated in many risk management projects)  
\_\_\_\_\_ Experienced (participated in a several risk management projects)  
\_\_\_\_\_ Knowledgeable (participated in at least one risk management project)  
\_\_\_\_\_ Indirect experience only (e.g., read about risk management practices;  
worked on a student project related to risk management)  
\_\_\_\_\_ No experience

## **Biographical Information**

RESPONSES TO THE FOLLOWING QUESTIONS WILL BE ANONYMOUS AND STRICTLY CONFIDENTIAL

PLEASE PROVIDE THE FOLLOWING BIOGRAPHICAL INFORMATION:

6. What is your age?

\_\_\_\_\_years

7. What is your gender?

\_\_\_\_\_Male

\_\_\_\_\_Female

8. How many years of work experience do you have?

\_\_\_\_\_years

9. Do you plan to work in an accounting, finance, or risk management position upon graduation?

\_\_\_\_\_Yes

\_\_\_\_\_No

\_\_\_\_\_Don't know

10. How long have you lived in the Orlando, FL area?

\_\_\_\_\_Years

\_\_\_\_\_Months

**Thank you for your participation!**

**APPENDIX D: STUDY 3 – EXPERIMENT 2:  
CASES AND QUESTIONNAIRE**

Condition 1: Proximate / Operational

Are you currently working for a company located within a 160 mile radius of Chicago, IL?

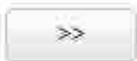
- Yes
- No

Are you currently employed in a position that requires you to render decisions associated with organizational risk management?

- Yes
- No

Do you have at least 2 years' experience with rendering corporate risk management decisions?

- Yes
- No



**Title of Project:** Managers' Probability Assessment

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take 5-10 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about decision-makers' judgment and decision-making processes.

The study provides you with some background information about a hypothetical company and asks you to assume the role of a risk manager for this company. You will then be asked to render judgments about the likelihood that various risks will materialize. Questions about your understanding of the case material and demographic questions are asked at the end of the survey.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.

### **General Instructions**

A few questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

**Thank you for participating!**



## BACKGROUND

Assume you and your family have lived at your current location for the last 10 years. A few years ago, you accepted a risk management position with ABC Company, a company that is located in Chicago, IL. Since you started your job with Chicago-based ABC, you have been promoted several times and you are now the leader of a corporate team in charge of risk management. Your entire team is based out of ABC's headquarter in Chicago, IL.

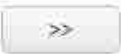
ABC is a publicly traded electronic equipment manufacturer that sells its products in over 80 countries. The company operates subsidiaries across the globe. Two years ago, ABC established another subsidiary – RoboSurge - in Toronto, Canada, RoboSurge specializes in the design and production of customized robotic surgery tools. Management of the subsidiary is almost exclusively comprised of highly experienced U.S. expatriates who have previously worked at ABC's headquarter. Toronto-based RoboSurge currently sells its products to most of ABC's established markets with about 40 percent of sales going to the emerging markets of India, Eastern Europe, and Brazil. RoboSurge sources key supplies from China and Western Europe.





Your team is in the early stages of developing a formal risk management process for ABC's subsidiary in Toronto. As part of this process, your team has to consider the occurrence of various risks that - if they occur - may have a significant negative impact on the success of RoboSurge (and thus of ABC). Based on insights from various consulting reports and industry publications, your team compiled a list of critical risks. Assume your team has determined that each of those risks could potentially force Toronto-based RoboSurge out of business.

**The identified critical risks are displayed on the following five screens. You will be asked to provide your assessment of each of those risks. Please respond thoughtfully to each question.**

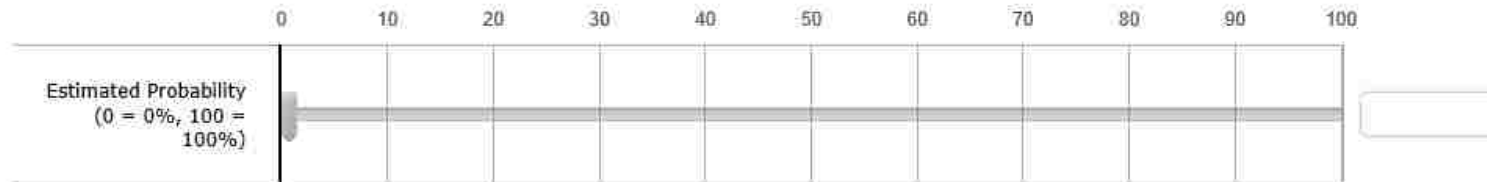


**Risk #1:**

**Uncertainty surrounding the viability of key suppliers or scarcity of supply will make it difficult to deliver RoboSurge's products and services.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important



**Risk #2:**

**Cyber threats have the potential to significantly disrupt RoboSurge's core operations.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

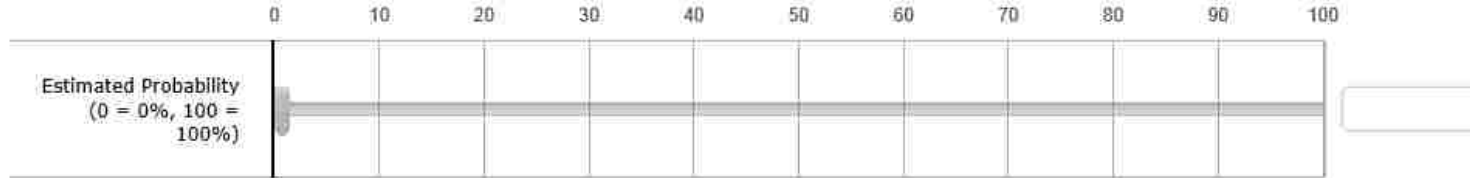
Extremely important



**Risk #3:**

**RoboSurge's existing operations may not be able to meet performance expectations related to quality, time to market, cost and innovation as well as its competitors.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

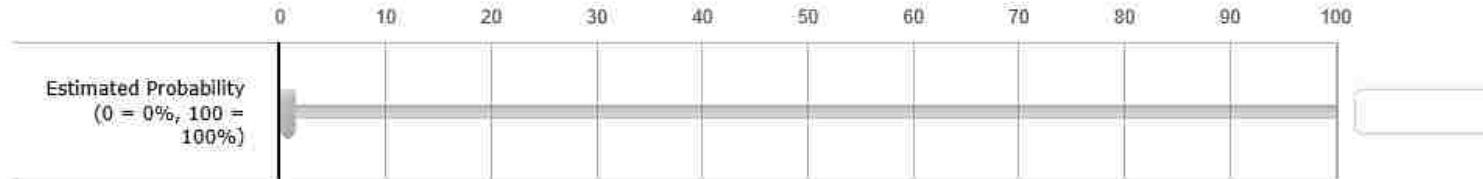


**Risk #4:**

**Succession challenges and the ability to retain top talent may limit RoboSurge's ability to achieve operational targets.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

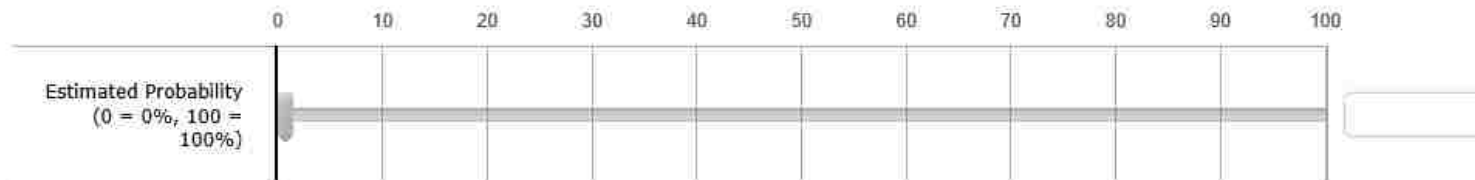


**Risk #5:**

**Inability to utilize data analytics and "big data" to achieve market intelligence and increase productivity and efficiency is likely to affect RoboSurge's management of core operations and strategic plan.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

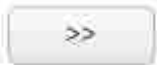


The scenario you just read described that your entire risk management team is based out of ABC's headquarter in Chicago, IL.

- True
- False

The preceding scenario described that RoboSurge is located in Toronto, Canada.

- True
- False



Have you ever served as a member of a team which had to assess the probability (i.e., the likelihood) that certain risks will materialize?

- Yes
- No

Have you ever used a checklist or risk register which lists various risk factors and asks you to make a judgment about the likelihood that those risks will materialize (e.g., the checklist or risk register may ask you to rate each risk as "unlikely", "likely", "frequent", "rare", etc.; alternatively, the checklist or risk register may ask you for a percentage similar to the preceding task)?

- Yes
- No

What is your age?

What is your gender?

- Male
- Female



How many years of overall work experience do you have?

How many years of risk management experience do you have?

Which title best describes your position within your firm?

- Staff
- Supervisor
- Manager
- Director
- Partner
- C-level Executive

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CPA (Certified Public Accountant)
- CIA (Certified Internal Auditor)
- CMA (Certified Management Accountant)
- CRISC (Certified in Risk and Information Systems Control)
- CRMA (Certification in Risk Management Assurance)
- FRM (Financial Risk Manager)
- PRM (Professional Risk Manager)
- None
- Other (please specify)

Please enter your current job title:

Please enter your ZIP code:

**Thank you for your participation!**



Condition 2: Proximate / Non-Operational

Are you currently working for a company located within a 160 mile radius of Chicago, IL?

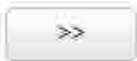
- Yes
- No

Are you currently employed in a position that requires you to render decisions associated with organizational risk management?

- Yes
- No

Do you have at least 2 years' experience with rendering corporate risk management decisions?

- Yes
- No



**Title of Project:** Managers' Probability Assessment

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take 5-10 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about decision-makers' judgment and decision-making processes.

The study provides you with some background information about a hypothetical company and asks you to assume the role of a risk manager for this company. You will then be asked to render judgments about the likelihood that various risks will materialize. Questions about your understanding of the case material and demographic questions are asked at the end of the survey.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.

### **General Instructions**

A few questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

**Thank you for participating!**



## BACKGROUND

Assume you and your family have lived at your current location for the last 10 years. A few years ago, you accepted a risk management position with ABC Company, a company that is located in Chicago, IL. Since you started your job with Chicago-based ABC, you have been promoted several times and you are now the leader of a corporate team in charge of risk management. Your entire team is based out of ABC's headquarter in Chicago, IL.

ABC is a publicly traded electronic equipment manufacturer that sells its products in over 80 countries. The company operates subsidiaries across the globe. Two years ago, ABC established another subsidiary – RoboSurge - in Toronto, Canada, RoboSurge specializes in the design and production of customized robotic surgery tools. Management of the subsidiary is almost exclusively comprised of highly experienced U.S. expatriates who have previously worked at ABC's headquarter. Toronto-based RoboSurge currently sells its products to most of ABC's established markets with about 40 percent of sales going to the emerging markets of India, Eastern Europe, and Brazil. RoboSurge sources key supplies from China and Western Europe.



Your team is in the early stages of developing a formal risk management process for ABC's subsidiary in Toronto. As part of this process, your team has to consider the occurrence of various risks that - if they occur - may have a significant negative impact on the success of RoboSurge (and thus of ABC). Based on insights from various consulting reports and industry publications, your team compiled a list of critical risks. Assume your team has determined that each of those risks could potentially force Toronto-based RoboSurge out of business.

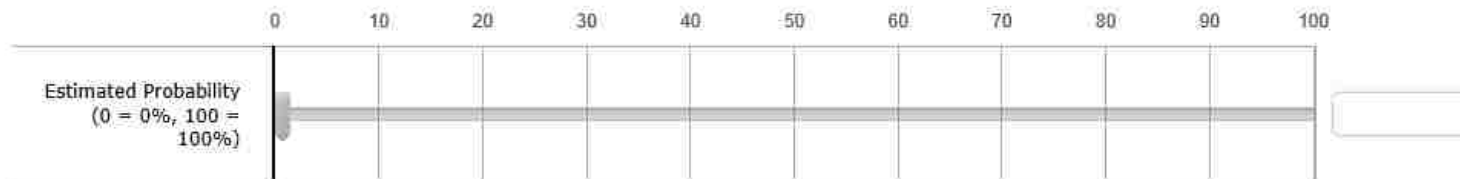
**The identified critical risks are displayed on the following five screens. You will be asked to provide your assessment of each of those risks. Please respond thoughtfully to each question.**



**Risk #1:**

**Potential changes in trade restrictions or other government sanctions will limit RoboSurge's ability to operate effectively and efficiently in international markets.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

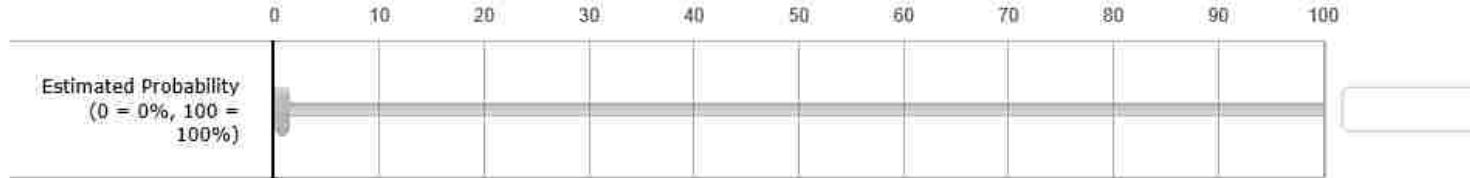
Extremely important



**Risk #2:**

**Economic conditions in markets RoboSurge currently serves will significantly restrict growth opportunities for the organization.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important





**Risk #3:**

**Ease of entrance of new competitors into the industry and marketplace will threaten RoboSurge's market share.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

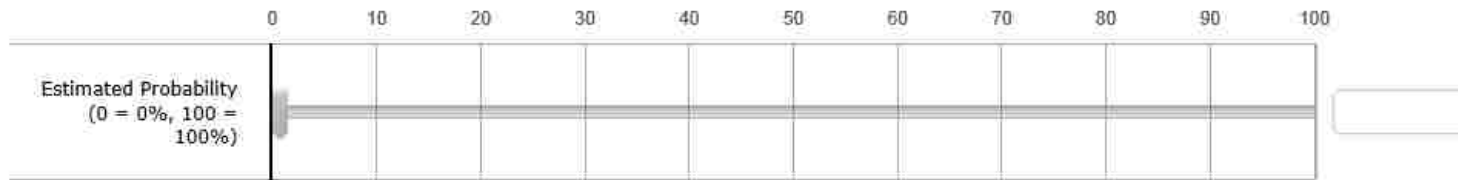
Extremely important



**Risk #4:**

**Shifts in social, environmental, and other customer preferences and expectations will be difficult for RoboSurge to identify and address on a timely basis.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important



**Risk #5:**

**An unexpected crisis would likely have a significant impact on RoboSurge's reputation given the organization's existing preparedness.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

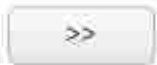


The scenario you just read described that your entire risk management team is based out of ABC's headquarter in Chicago, IL.

- True
- False

The preceding scenario described that RoboSurge is located in Toronto, Canada.

- True
- False



Have you ever served as a member of a team which had to assess the probability (i.e., the likelihood) that certain risks will materialize?

- Yes
- No

Have you ever used a checklist or risk register which lists various risk factors and asks you to make a judgment about the likelihood that those risks will materialize (e.g., the checklist or risk register may ask you to rate each risk as "unlikely", "likely", "frequent", "rare", etc.; alternatively, the checklist or risk register may ask you for a percentage similar to the preceding task)?

- Yes
- No

What is your age?

What is your gender?

- Male
- Female

How many years of overall work experience do you have?

How many years of risk management experience do you have?

Which title best describes your position within your firm?

- Staff
- Supervisor
- Manager
- Director
- Partner
- C-level Executive

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CPA (Certified Public Accountant)
- CIA (Certified Internal Auditor)
- CMA (Certified Management Accountant)
- CRISC (Certified in Risk and Information Systems Control)
- CRMA (Certification in Risk Management Assurance)
- FRM (Financial Risk Manager)
- PRM (Professional Risk Manager)
- None
- Other (please specify)

Please enter your current job title

Please enter your ZIP code

**Thank you for your participation!**



Condition 3: Remote / Operational

Are you currently working for a company located within a 160 mile radius of Chicago, IL?

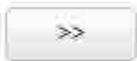
- Yes
- No

Are you currently employed in a position that requires you to render decisions associated with organizational risk management?

- Yes
- No

Do you have at least 2 years' experience with rendering corporate risk management decisions?

- Yes
- No





**Title of Project:** Managers' Probability Assessment

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take 5-10 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about decision-makers' judgment and decision-making processes.

The study provides you with some background information about a hypothetical company and asks you to assume the role of a risk manager for this company. You will then be asked to render judgments about the likelihood that various risks will materialize. Questions about your understanding of the case material and demographic questions are asked at the end of the survey.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.

### **General Instructions**

A few questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

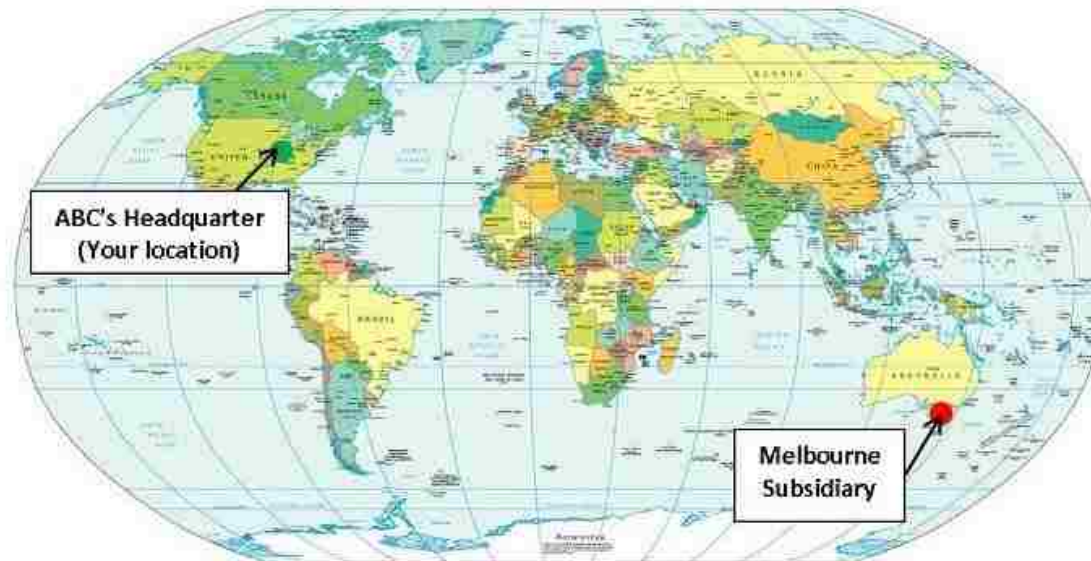
**Thank you for participating!**



## BACKGROUND

Assume you and your family have lived at your current location for the last 10 years. A few years ago, you accepted a risk management position with ABC Company, a company that is located in Chicago, IL. Since you started your job with Chicago-based ABC, you have been promoted several times and you are now the leader of a corporate team in charge of risk management. Your entire team is based out of ABC's headquarter in Chicago, IL.

ABC is a publicly traded electronic equipment manufacturer that sells its products in over 80 countries. The company operates subsidiaries across the globe. Two years ago, ABC established another subsidiary – RoboSurge – in Melbourne, Australia. RoboSurge specializes in the design and production of customized robotic surgery tools. Management of the subsidiary is almost exclusively comprised of highly experienced U.S. expatriates who have previously worked at ABC's headquarter. Melbourne-based RoboSurge currently sells its products to most of ABC's established markets with about 40 percent of sales going to the emerging markets of India, Eastern Europe, and Brazil. RoboSurge sources key supplies from China and Western Europe.



Your team is in the early stages of developing a formal risk management process for ABC's subsidiary in Melbourne. As part of this process, your team has to consider the occurrence of various risks that - if they occur - may have a significant negative impact on the success of RoboSurge (and thus of ABC). Based on insights from various consulting reports and industry publications, your team compiled a list of critical risks. Assume your team has determined that each of those risks could potentially force Melbourne-based RoboSurge out of business.

**The identified critical risks are displayed on the following five screens. You will be asked to provide your assessment of each of those risks. Please respond thoughtfully to each question.**

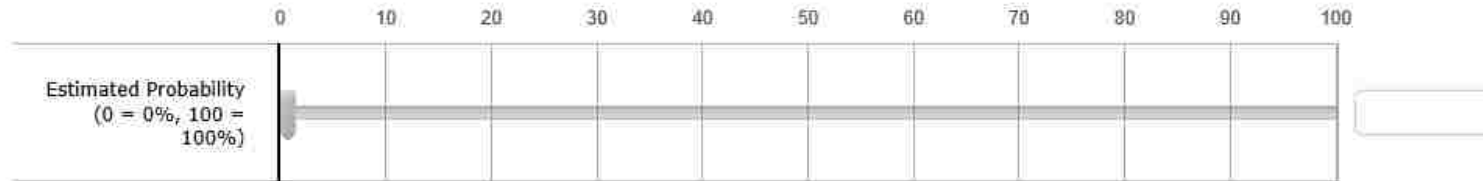


**Risk #1:**

**Uncertainty surrounding the viability of key suppliers or scarcity of supply will make it difficult to deliver RoboSurge's products and services.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

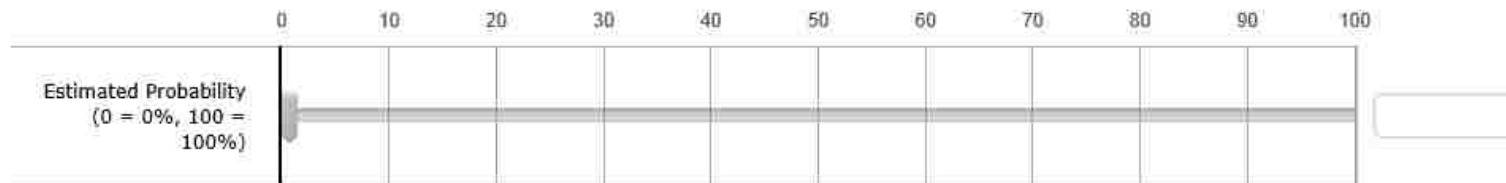
Extremely important



**Risk #2:**

**Cyber threats have the potential to significantly disrupt RoboSurge's core operations.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

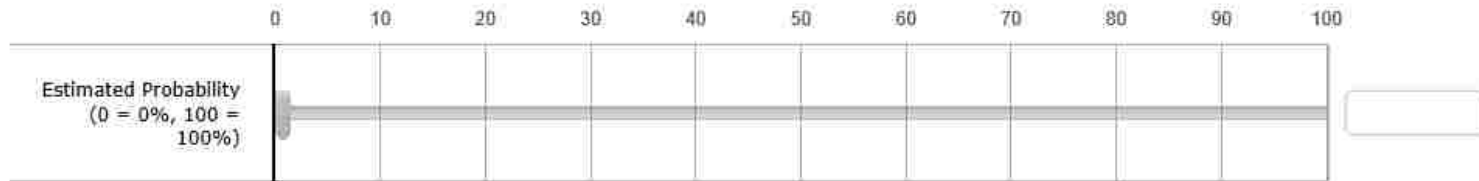
Extremely important



**Risk #3:**

**RoboSurge's existing operations may not be able to meet performance expectations related to quality, time to market, cost and innovation as well as its competitors.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

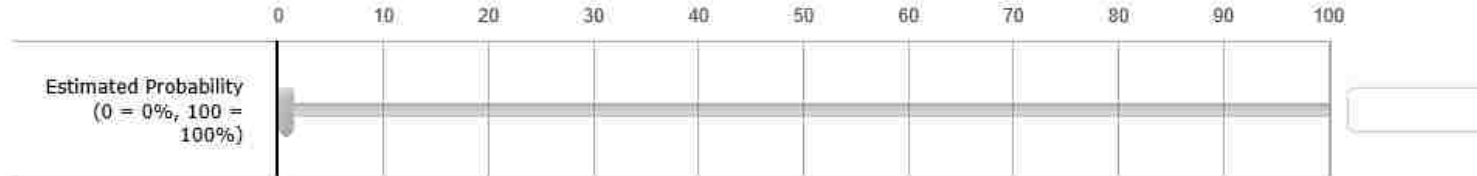


**Risk #4:**

**Succession challenges and the ability to retain top talent may limit RoboSurge's ability to achieve operational targets.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

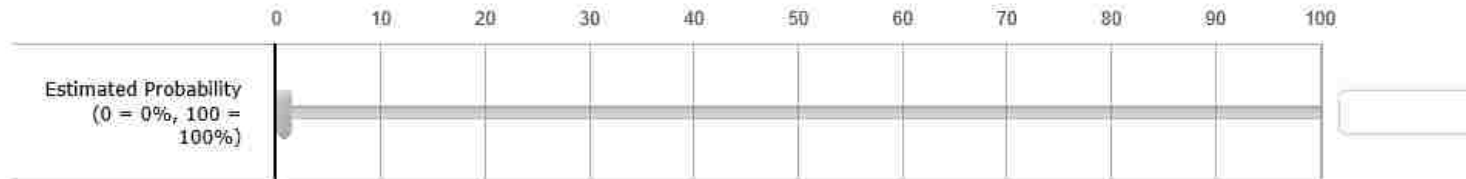


**Risk #5:**

**Inability to utilize data analytics and "big data" to achieve market intelligence and increase productivity and efficiency is likely to affect RoboSurge's management of core operations and strategic plan.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important



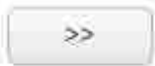


The scenario you just read described that your entire risk management team is based out of ABC's headquarter in Chicago, IL.

- True
- False

The preceding scenario described that RoboSurge is located in Melbourne, Australia.

- True
- False



Have you ever served as a member of a team which had to assess the probability (i.e., the likelihood) that certain risks will materialize?

- Yes
- No

Have you ever used a checklist or risk register which lists various risk factors and asks you to make a judgment about the likelihood that those risks will materialize (e.g., the checklist or risk register may ask you to rate each risk as "unlikely", "likely", "frequent", "rare", etc.; alternatively, the checklist or risk register may ask you for a percentage similar to the preceding task)?

- Yes
- No

What is your age?

What is your gender?

- Male
- Female

How many years of overall work experience do you have?

How many years of risk management experience do you have?

Which title best describes your position within your firm?

- Staff
- Supervisor
- Manager
- Director
- Partner
- C-level Executive

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)

Which professional licenses do you hold? (please check all that apply)

- CPA (Certified Public Accountant)
- CIA (Certified Internal Auditor)
- CMA (Certified Management Accountant)
- CRISC (Certified in Risk and Information Systems Control)
- CRMA (Certification in Risk Management Assurance)
- FRM (Financial Risk Manager)
- PRM (Professional Risk Manager)
- None
- Other (please specify)

Please enter your current job title:

Please enter your ZIP code:

**Thank you for your participation!**



#### Condition 4: Remote / Non-Operational

Are you currently working for a company located within a 160 mile radius of Chicago, IL?

- Yes
- No

Are you currently employed in a position that requires you to render decisions associated with organizational risk management?

- Yes
- No

Do you have at least 2 years' experience with rendering corporate risk management decisions?

- Yes
- No



**Title of Project:** Managers' Probability Assessment

**Principal Investigator:** Martin Weisner, Ph.D. Student

You are invited to participate in a research project conducted by Martin Weisner, Ph.D. Candidate, and Dr. Steve Sutton, Faculty Supervisor, at the University of Central Florida. You will be asked to answer questions that will take 5-10 minutes of your time. There are no anticipated potential risks associated with this study. The purpose of this research is to learn more about decision-makers' judgment and decision-making processes.

The study provides you with some background information about a hypothetical company and asks you to assume the role of a risk manager for this company. You will then be asked to render judgments about the likelihood that various risks will materialize. Questions about your understanding of the case material and demographic questions are asked at the end of the survey.

Please note that participation in this study is voluntary and your responses will be completely anonymous. Your name will not be collected, and only aggregated data will be included in any publications or presentations resulting from this study. If you decide to participate, you have the right to withdraw your consent or discontinue participation at any time without penalty.

If you have questions, concerns, or complaints you may contact Martin Weisner, Ph.D. Candidate, Dixon School of Accounting, College of Business at (407) 823-1477 (phone) or at martin.weisner@ucf.edu (email) or Dr. Steve Sutton, Faculty Supervisor, Dixon School of Accounting, College of Business at sgsutton@ucf.edu. Since this research involves human participants, it has been approved by the Institutional Review Board (IRB) at the University of Central Florida. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, 407-823-2901 (phone) or irb@mail.ucf.edu (email).

By continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age. Thank you very much for agreeing to participate.

If you consent to take part in this survey, please click the arrow to advance.

### **General Instructions**

A few questions will test your understanding of critical (and very obvious) facts from the case scenario and test your overall attention to the questions. **We are only permitted to process payment for participants who demonstrate that they have paid sufficient attention and are able to correctly answer those basic questions.** If you are unable to answer those very simple test questions embedded in the material the survey will end.

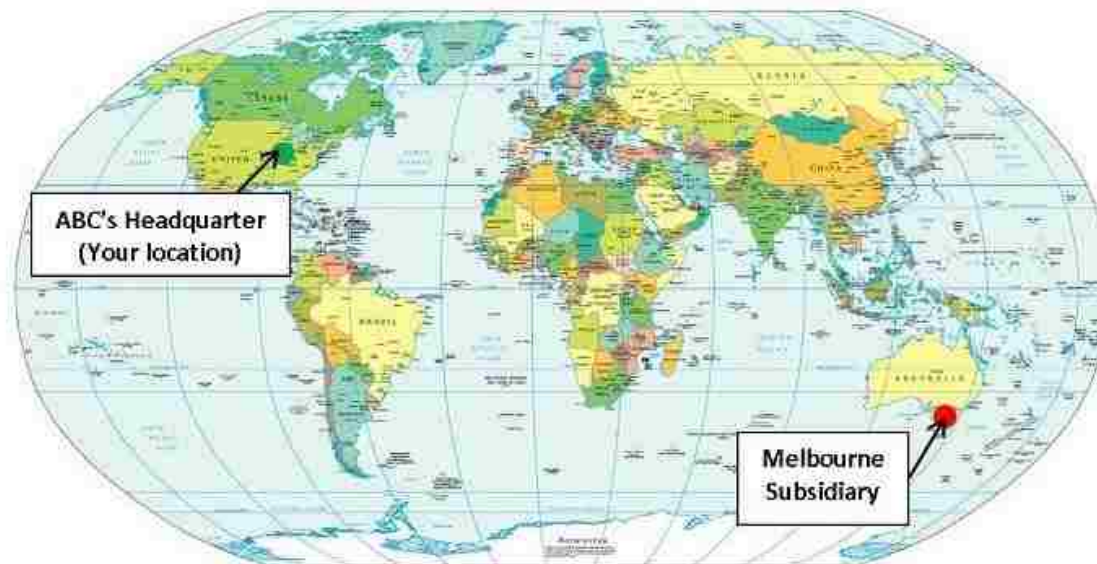
**Thank you for participating!**



## BACKGROUND

Assume you and your family have lived at your current location for the last 10 years. A few years ago, you accepted a risk management position with ABC Company, a company that is located in Chicago, IL. Since you started your job with Chicago-based ABC, you have been promoted several times and you are now the leader of a corporate team in charge of risk management. Your entire team is based out of ABC's headquarter in Chicago, IL.

ABC is a publicly traded electronic equipment manufacturer that sells its products in over 80 countries. The company operates subsidiaries across the globe. Two years ago, ABC established another subsidiary – RoboSurge – in Melbourne, Australia. RoboSurge specializes in the design and production of customized robotic surgery tools. Management of the subsidiary is almost exclusively comprised of highly experienced U.S. expatriates who have previously worked at ABC's headquarter. Melbourne-based RoboSurge currently sells its products to most of ABC's established markets with about 40 percent of sales going to the emerging markets of India, Eastern Europe, and Brazil. RoboSurge sources key supplies from China and Western Europe.



Your team is in the early stages of developing a formal risk management process for ABC's subsidiary in Melbourne. As part of this process, your team has to consider the occurrence of various risks that - if they occur - may have a significant negative impact on the success of RoboSurge (and thus of ABC). Based on insights from various consulting reports and industry publications, your team compiled a list of critical risks. Assume your team has determined that each of those risks could potentially force Melbourne-based RoboSurge out of business.

**The identified critical risks are displayed on the following five screens. You will be asked to provide your assessment of each of those risks. Please respond thoughtfully to each question.**



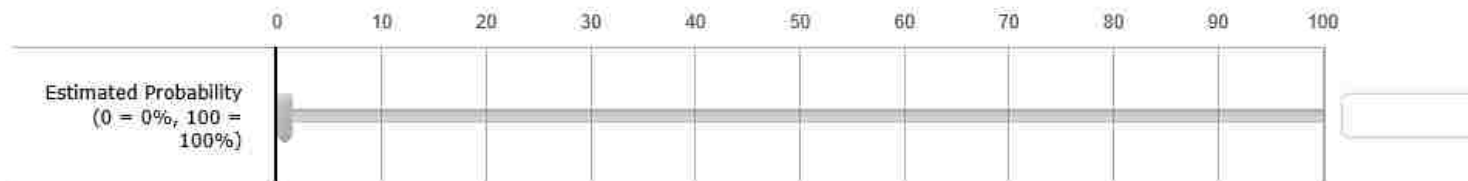


**Risk #1:**

**Potential changes in trade restrictions or other government sanctions will limit RoboSurge's ability to operate effectively and efficiently in international markets.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

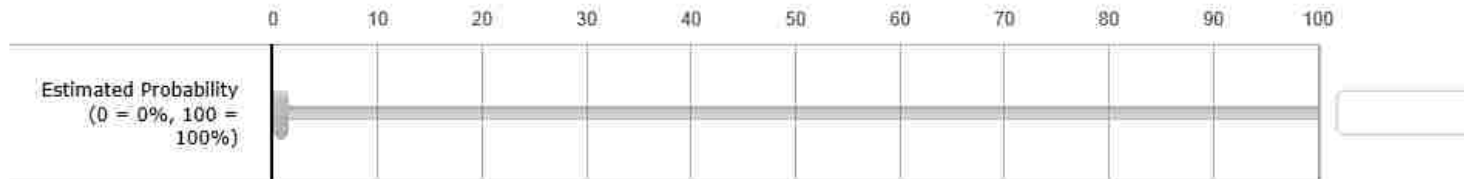
Extremely important



**Risk #2:**

**Economic conditions in markets RoboSurge currently serves will significantly restrict growth opportunities for the organization.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No Impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important



**Risk #3:**

**Ease of entrance of new competitors into the industry and marketplace will threaten RoboSurge's market share.**

How likely do you think it is that this risk will occur at some point over the next 10 years?

(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

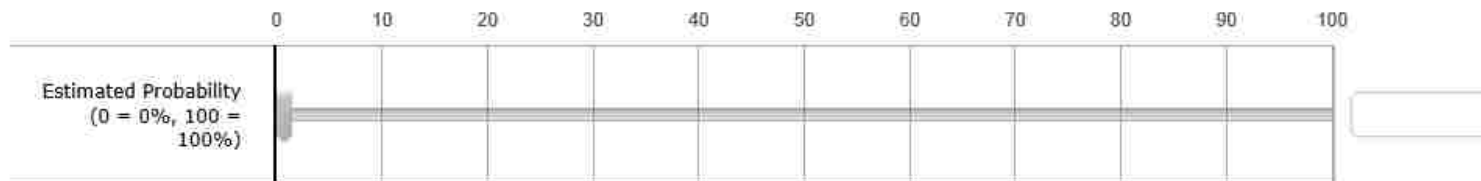
Extremely important



**Risk #4:**

**Shifts in social, environmental, and other customer preferences and expectations will be difficult for RoboSurge to identify and address on a timely basis.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

- No impact at all
- Low impact
- Moderate impact
- Large impact
- Extensive impact

How important do you think it is to devote resources to manage this risk?

- No at all important
- Slightly important
- Moderately important
- Important
- Extremely important



**Risk #5:**

**An unexpected crisis would likely have a significant impact on RoboSurge's reputation given the organization's existing preparedness.**

How likely do you think it is that this risk will occur at some point over the next 10 years?  
(Please use the sliding scale below to indicate your probability assessment - i.e., your likelihood judgment)



Assume this risk materializes at the Toronto operations. How significant do you think its impact will be?

No impact at all

Low impact

Moderate impact

Large impact

Extensive impact

How important do you think it is to devote resources to manage this risk?

No at all important

Slightly important

Moderately important

Important

Extremely important

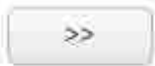


The scenario you just read described that your entire risk management team is based out of ABC's headquarter in Chicago, IL.

- True
- False

The preceding scenario described that RoboSurge is located in Melbourne, Australia.

- True
- False



Have you ever served as a member of a team which had to assess the probability (i.e., the likelihood) that certain risks will materialize?

- Yes
- No

Have you ever used a checklist or risk register which lists various risk factors and asks you to make a judgment about the likelihood that those risks will materialize (e.g., the checklist or risk register may ask you to rate each risk as "unlikely", "likely", "frequent", "rare", etc.; alternatively, the checklist or risk register may ask you for a percentage similar to the preceding task)?

- Yes
- No

What is your age?

What is your gender?

- Male
- Female

How many years of overall work experience do you have?

How many years of risk management experience do you have?

Which title best describes your position within your firm?

- Staff
- Supervisor
- Manager
- Director
- Partner
- C-level Executive

What is your highest academic degree?

- Bachelor's degree
- Master's degree
- Ph.D.
- Other (please specify)



Which professional licenses do you hold? (please check all that apply)

- CPA (Certified Public Accountant)
- CIA (Certified Internal Auditor)
- CMA (Certified Management Accountant)
- CRISC (Certified in Risk and Information Systems Control)
- CRMA (Certification in Risk Management Assurance)
- FRM (Financial Risk Manager)
- PRM (Professional Risk Manager)
- None
- Other (please specify)

Please enter your current job title:

Please enter your ZIP code:

**Thank you for your participation!**



## **APPENDIX E: IRB APPROVALS**



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

## Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
FWA00000351, IRB00001138

To: Martin M. Weisner

Date: May 16, 2014

Dear Researcher:

On 5/16/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination  
Project Title: Auditors' Probability Assessment (Pilot Test)  
Investigator: Martin M. Weisner  
IRB Number: SBE-14-10307  
Funding Agency:  
Grant Title:  
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 05/16/2014 09:13:22 AM EDT

IRB Coordinator



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32816-3146  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
FWA00000351, IRB00001138  
To: Martin M. Weisner  
Date: May 16, 2014

Dear Researcher:

On 5/16/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Auditors' Probability Assessment (Experiment 1)
Investigator:	Martin M. Weisner
IRB Number:	SBE-14-10306
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegtelewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 05/16/2014 08:43:55 AM EDT

IRB Coordinator



University of Central Florida Institutional Review Board  
 Office of Research & Commercialization  
 12201 Research Parkway, Suite 501  
 Orlando, Florida 32826-3246  
 Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
 FWA00000351, IRB00001138  
 To: Martin M. Weisner  
 Date: November 26, 2014

Dear Researcher:

On 11/26/2014, the IRB approved the following minor modification to human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Modification Type:	In order to increase participation, auditors who participated in earlier research will be offered a \$15 gift card (Starbucks or Amazon) to participate. A revised protocol has been uploaded and a revised consent document has been approved for use.
Project Title:	Auditors' Probability Assessment (Experiment 1)
Investigator:	Martin M. Weisner
IRB Number:	SBE-14-10306
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in IRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 11/26/2014 01:54:58 PM EST

IRB Coordinator



University of Central Florida Institutional Review Board  
 Office of Research & Commercialization  
 12201 Research Parkway, Suite 501  
 Orlando, Florida 32826-3246  
 Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
 FWA00000351, IRB00001138  
 To: Martin M. Weisner  
 Date: April 03, 2014

Dear Researcher:

On 4/3/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Auditors' Probability Assessment
Investigator:	Martin M. Weisner
IRB Number:	SBE-14-10225
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dzegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

IRB Coordinator



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
11201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

## Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
FWA00000351, IRB00001138  
To: Martin M. Weisner  
Date: January 20, 2015

Dear Researcher:

On 01/20/2015, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Modification Type:	The total number of possible participants has increased from 200 to 300. A revised protocol has been uploaded in iRIS.
Project Title:	Auditors' Probability Assessment
Investigator:	Martin M. Weisner
IRB Number:	SBE-14-10225
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

A handwritten signature in black ink that reads "Kanielle Chay" followed by a horizontal line.

IRB Coordinator



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
FWA00000351, IRB00001138

To: Martin M. Weisner

Date: May 16, 2014

Dear Researcher:

On 5/16/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Risk Categories and Probability Assessment (Experiment 1)
Investigator:	Martin M. Weisner
IRB Number:	SBE-14-10308
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 05/16/2014 10:13:20 AM EDT

IRB Coordinator





University of Central Florida Institutional Review Board  
 Office of Research & Commercialization  
 12201 Research Parkway, Suite 501  
 Orlando, Florida 32826-3246  
 Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
 FWA00000351, IRB00001138  
 To: Martin M. Weiner  
 Date: January 20, 2015

Dear Researcher:

On 01/20/2015, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Modification Type:	The total number of possible participants has increased from 100 to 200. A revised protocol has been uploaded in iRIS.
Project Title:	Risk Categories and Probability Assessment (Experiment 1)
Investigator:	Martin M. Weiner
IRB Number:	SBE-14-10308
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

IRB Coordinator



University of Central Florida Institutional Review Board  
 Office of Research & Commercialization  
 12201 Research Parkway, Suite 501  
 Orlando, Florida 32826-3246  
 Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
 FWA00000351, IRB00001138  
 To: Martin M. Weisner  
 Date: May 16, 2014

Dear Researcher:

On 5/16/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Risk Categories and Probability Assessment (Experiment 2)
Investigator:	Martin M. Weisner
IRB Number:	SBE-14-10309
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 05/16/2014 11:21:25 AM EDT

IRB Coordinator