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# OPTIMISM BIAS IN MANAGING IT PROJECT RISKS: A CONSTRUAL LEVEL THEORY PERSPECTIVE

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Eliezer Shalev, Mark Keil, Jong Seok Lee, and Yoav Ganzach, 2014, "OPTIMISM BIAS IN MANAGING IT PROJECT RISKS: A CONSTRUAL LEVEL THEORY PERSPECTIVE", Proceedings of the European Conference on Information Systems (ECIS) 2014, Tel Aviv, Israel, June 9-11, 2014, ISBN 978-0-9915567-0-0
http://aisel.aisnet.org/ecis2014/proceedings/track13/8

# OPTIMISM BIAS IN MANAGING IT PROJECT RISKS: A CONSTRUAL LEVEL THEORY PERSPECTIVE

*Complete Research*

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## Abstract

*Prior research has shown that people have a tendency to be overly optimistic about future events (i.e., optimism bias) in a variety of settings. In this study, we suggest that optimism bias has significant implications for IT project risk management, as it may cause people to become overly optimistic that they can easily manage project risks. Drawing upon construal level theory (CLT), we investigate optimism bias in managing IT project risks. Based on an experiment with IT professionals, we found that a high-level construal of a project risk leads individuals to have a more optimistic perception about successfully managing the project risk, causes them to focus more on benefits over costs in choosing a risk management plan, and leads them to identify more pros than cons associated with a risk management plan relative to a low-level construal. Implications for both theory and practice are discussed.*

*Keywords: IT project risk management, construal level theory, optimism bias, cognitive bias, project management.*

# 1 Introduction

IT projects are notoriously difficult to manage because they involve coordinating a complex set of activities often spanning both intra and inter-organizational boundaries, and must often be undertaken against a backdrop of both market and technological uncertainty. Schedule and budget overruns are common and such projects are often unsuccessful, in part, because project managers frequently fail to adequately identify and manage the risks that can and often do materialize.

Risks are potential negative events that can arise due to the uncertainty of the project environment. IT project risk management focuses on identifying, analyzing, and preventing or minimizing the impact of events that can threaten project success (Schmidt, Lyytinen, Keil, & Cule, 2001; Wallace & Keil, 2004). While most experts agree that better risk management has the potential to improve IT project success rates, such practices have yet to be broadly embraced in most organizations. Moreover, even in organizations where risk management practices have been adopted, it appears that individuals still have a tendency to underestimate or ignore risks. One possible explanation for this apparent paradox is that IT project managers, like all human beings, are subject to cognitive biases that can affect their decision-making. Specifically, we suggest that optimism bias – a tendency to be overly optimistic about future events (Heine & Lehman, 1995; Weinstein, 1980) – can influence risk management decisions.

Prior research has shown that optimism bias operates across a broad range of different contexts. For example, people tend to underestimate their likelihood of having a heart attack (Avis, Smith, & McKinlay, 1989), being involved in a car accident (McKenna, Stainer, & Lewis, 1991), being the victim of crime (Perloff & Fetzer, 1986), and having an unwanted pregnancy (Burger & Burns, 1988). While optimism bias has been found to occur in a variety of settings, it has not been investigated in the context of IT project risk management, where we believe it may influence risk identification, risk assessment, and risk mitigation.

Much of the prior research on optimism bias has focused on peoples' tendency to believe that they are less at risk of experiencing a negative future event compared to others (Chambers & Windschitl, 2004; Helweg-Larsen & Shepperd, 2001; Weinstein, 1980). This line of research is rooted in comparative judgment (Moore & Small, 2007), which suggests that people tend to view themselves in a more positive light than others (Alicke, Vredenburg, Hiatt, & Govorun, 2001; Brown, 1986; Campbell, 1986; Kunda, 1990; Taylor & Brown, 1988). While the comparative optimism perspective has been useful in other contexts, it does not provide a good explanation of optimism bias in the context of IT project risk management (which does not necessarily involve comparative judgment).

Closely related to the notion of optimism bias, but more germane to the project management context, is a phenomenon known as the planning fallacy which refers to the tendency to overestimate the pace at which we will complete tasks (Buehler, Griffin, & Ross, 1994). In the project management context, the planning fallacy can lead to overly optimistic estimates regarding both the cost and duration of a project (Morgenshtern, Raz, & Dvir, 2007). Several explanations have been offered to explain the planning fallacy including: (1) a tendency to underestimate one's own completion time (but not others' completion times), and (2) focusing on plan-based scenarios rather than on relevant past experience (Buehler, et al., 1994). Two other possible explanations are that people selectively base their estimates on only positive past performance (Pezzo, Litman, & Pezzo, 2006) or that they overestimate the level of slack resources that will be available in the future (Zauberman & Lynch, 2005).

While the planning fallacy provides insight into why projects may exceed their original budgets and schedules, it does not provide a good explanation for why project managers tend to underestimate the risks associated with complex projects or become overly optimistic regarding their ability to manage

such risks. Thus, in this study we draw upon construal level theory (CLT) (Trope & Liberman, 2010), which we believe serves an excellent theoretical lens to study optimism bias in the context of IT project risk management.

Project risk management is challenging because it requires careful consideration of future events that may or may not occur. CLT provides a solid theoretical basis for understanding individuals' cognition when it comes to dealing with psychologically distant versus proximal events. Among other things, CLT suggests that "decisions regarding distant future events are likely to be based on relatively central and abstract features of events, whereas decisions regarding near future events are likely to be based on more incidental and concrete features of events" (Liberman & Trope, 1998, p. 5). This aspect of CLT allows us to study how people think about future events that can adversely affect project success (i.e., project risks) and is consistent with prior applications of CLT in explaining consumer behavior (Fiedler 2007) and economic behavior (Leiser et al. 2008). To date however, CLT has not been considered either in optimism bias research or project risk management research.

In summary, the objective of this study is to investigate how construal levels influence optimism bias in managing IT project risks. This study followed an engaged scholarship approach and was conducted as a joint effort by a university research team and a 600-employee technology company. Specifically, we conducted an experiment with 183 employees who were working on a large-scale IT project. Following a construal level manipulation involving a potential risk to an actual project that our participants were working on, we measured optimism bias with regard to project members' perception of risk mitigation success and preferences for risk mitigation plans.

The remainder of the paper is organized as follows; first, we offer a brief overview of the literatures concerning IT project risk management and construal level theory, followed by the development of hypotheses. Next, we describe an experiment conducted to test our hypotheses, followed by the results that were obtained. Finally, we discuss the implications of our study for both research and practice.

## 2 IT Project Risk Management

Project risk management is an ongoing set of activities aimed at identifying potential risks, estimating both their likelihood of occurrence and potential impact, and developing a plan to reduce their chance of occurring or to mitigate their impact. To date, research on IT project risk management has largely focused on developing tools or frameworks for identifying and evaluating project risks e.g., (Barki, Rivard, & Talbot, 1993; Keil, Cule, Lyytinen, & Schmidt, 1998; Schmidt, et al., 2001), and investigating the impact of project risks on project outcomes e.g., (Barki, Rivard, & Talbot, 2001; Wallace & Keil, 2004; Wallace, Keil, & Rai, 2004). Although much is known about what causes IT projects to fail, there is still very little empirical evidence that this knowledge is actually used for managing risks in projects (Bakker, Boonstra, & Wortmann, 2010) or how current prescriptions of risk management contribute to project success (Papke-Shields, Beise, & Quan, 2010). Moreover, the cognitive heuristics and biases that shape judgment and choice under uncertainty have not been adequately leveraged to further our understanding of IT project risk management.

The combination of limited human cognitive capacity coupled with decision situations characterized by high levels of complexity, ambiguity, and uncertainty causes people to rely on heuristics (i.e., simplifying strategies or rules of thumb) in making decisions (Einhorn & Hogarth, 1986). These heuristics are subject to a set of subconscious, systematic errors known as cognitive biases. Thus, cognitive bias is inextricably intertwined with human decision-making (Hogarth, 1987).

Prior research has shown that people commonly fall victim to a variety of cognitive biases in managing IT projects, for example, illusion of control (Keil, Depledge, & Rai, 2007), planning fallacy (Jørgensen, 2004; Kahneman & Tversky, 1979), and self-justification (Keil, 1995). Further, cognitive

biases can lead to undesired consequences, including inaccurate project estimates (Flyvbjerg, 2006) and escalating commitment to a troubled project (Keil, Mann, & Rai, 2000; Lee, Keil, & Kasi, 2012). Yet, the linkage between specific cognitive biases and IT project risk management remains largely unexplored.

Prior research suggests that cognitive bias mostly manifests itself in uncertain situations (Lipshitz & Strauss, 1997; McCray, Purvis, & McCray, 2002; Tversky & Kahneman, 1974; Whyte & Saksa, 2007). Despite the fact that IT project risk management concerns anticipating and predicting uncertain future events, our understanding is very limited in terms of how specific cognitive biases may influence IT project risk management decisions. In this research, we focused on one particular cognitive bias that may be particularly influential in shaping risk management decisions, namely optimism bias.

# 3 Construal Level Theory

The different ways in which an object might be removed from the here and now - in time, in space, in social distance, and in hypotheticality - constitute different distance dimensions. Construal Level Theory (CLT) suggests: (a) that the various distances are cognitively related to each other, (b) that they similarly influence and are influenced by level of mental construal, and (c) that they similarly affect prediction, preference, and action (Trope & Liberman 2010).

Managers make choices and set preferences with respect to their construals of objects rather than the objects themselves. Thus, construals depend not only on the actual attributes of the objects but also on the object's psychological distance. This explains why psychological distance may impede rational considerations of judgment and choice.

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. According to CLT objects that are psychologically distant are mentally construed in high-level, abstract terms; whereas objects that are psychologically proximal are mentally construed in low-level, concrete terms (Trope, Liberman, & Wakslak, 2007). The reference point in people's mind is now, here, and the self, and as an object becomes further away from the reference point (in terms of time, space, or social distance) it becomes more abstract (Trope & Liberman, 2010). For example, in one CLT experiment, subjects who were asked to decide whether or not to install a word processor on a new computer (task) in the distant future focused on abstract characteristics of the task (e.g., the quality of the word processor) in making the decision (i.e., high-level construal). In contrast, when the same task was to occur in the near future people focused on concrete characteristics of the task (e.g., the time required to install the word processor) (i.e., low-level construal) (Liberman & Trope, 1998).

Prior research on CLT has found that construal levels (e.g., high-level vs. low-level construal) influence people's cognition and behaviors, and can thus affect their evaluations of objects and events (Trope & Liberman, 2000), their self-control (Fujita, Trope, Liberman, & Levin-Sagi, 2006), and even their behavior as consumers (Dhar & Kim, 2007). Moreover, construal level has even been shown to influence individuals' confidence predictions regarding future outcomes (Nussbaum, Liberman, and Trope (2006). Specifically, Nussbaum, et al. (2006) conducted a study showing that people had greater confidence in their prediction regarding the hypothesized effects of an experiment when the experiment was expected to occur in the distant future as compared to when it was expected to occur in the near future. In interpreting their results, Nussbaum, et al. (2006) suggested that a distant future event (the experiment expected to occur in the distant future) leads people to focus on theories that are abstract constructions of an idealized world (the high-level construal), and this makes people more confident that they will find the significant effects in their experiment. In contrast, a near future event leads people to focus on specific experimental settings and conditions (the low-level construal), and this decreases their confidence.

Trope, et al. (2007) suggested that construal levels can also have a significant effect on individuals' risk perception. For example, in an experiment, Chandran and Menon (2004) found that temporal framing (e.g., short-term vs. long-term) has an influence on how people perceive risks. Specifically, people perceived a greater risk when a potential event was presented in a day frame (every day a significant number of people succumb to heart disease) than when it was presented in a year frame (every year a significant number of people succumb to heart disease). In interpreting their results, Chandran and Menon (2004) suggested that temporal distance (near vs. distal) influences the concreteness of a risky event, thus influencing individuals' risk perception.

CLT also provides insight into the distinction between desirability concerns and feasibility concerns related to goal-directed behavior (Trope et al. 2007). Desirability concerns pertain to the value ascribed to reaching some end state, whereas feasibility concerns pertain to the means used to reach this state. As psychological distance increases, CLT predicts "desirability concerns should receive greater weight over feasibility concerns" (Trope et al. 2007, p. 89). Liberman and Trope (1998), for example, conducted an experiment in which participants were asked to make decisions such as whether or not to attend a lecture either in the near or in the distant future. They manipulated both desirability (e.g., how interesting the lecture was) and feasibility (e.g., how convenient the timing of the lecture was) and they found that "feasibility considerations are relatively more influential indecisions about the near future whereas desirability consideration are relatively more influential in decisions about the distant future" (Liberman & Trope, 1998, p. 12).

In summary, CLT serves an excellent theoretical lens for understanding individuals' cognition when it comes to dealing with psychologically distant versus proximal events. CLT offers insight into individuals' confidence predictions regarding future outcomes, how people perceive risks, and how they weigh desirability and feasibility concerns related to goal-directed behavior. We offer the following CLT-based explanation for optimism bias in project risk management. CLT contends that psychological distance increases the impact of high-level information (e.g., theories, self-beliefs, general trends) and decreases the impact of low-level information (e.g., irregular outcomes, specific situational and task characteristics) on prediction. Thus, two complementary processes may contribute to the biased optimism that is associated with predictions about psychologically distant events: underweighting of the uncertainty associated with low-level information and overweighting of the certainty associated with high-level information (Nussbaum et al. 2006; Wakslak et al. 2006). Although managers may know less about distant than near situations, their greater reliance on high-level construals in predicting the more distant situations may lead them to make more confident predictions about distant rather than near situations (Trope and Liberman 2010). Furthermore, CLT findings show that increased psychological distance can produce a higher level of perceived control (Fujita et al. 2006). Managers' predictions of risky events are affected by construal level, as is their level of confidence in their assessment and their perception of control over risks. Construal is also strongly tied to how managers plan for risk mitigation, and their perception of mitigation success.

In the next section, we use CLT to theorize how construal levels may influence optimism bias in managing IT project risks.

# 4 Development of Hypotheses

In managing IT project risks, individuals may use either low-level, concrete representations or high-level, abstract representations to understand future events that can adversely affect project success (i.e., project risks). Low-level construals of project risk are specific and will typically include more details relating to the risk, whereas high-level construals of project risk are less specific and will typically omit these details. In other words, consistent with Trope et al. (2007) we theorize that moving from a low to a high level construal involves a process of abstraction whereby abstract features of a risk are retained, but specific features are omitted. We further theorize that in the context

of IT project risk management individuals are optimistic about managing project risks when project risks are construed in high-level, abstract terms as such construals omit specific potential incidents that may occur and negatively influence project success. Thus, when a risk event is perceived to be more abstract or more distant, risk management plans will be perceived as having a higher probability of being successful. In contrast, low-level, concrete construals of project risks retain detailed features of the risk, thus individuals are less likely to exhibit optimism about managing these risks. Thus, when a risk event is perceived to be more proximal or concrete, risk management plans will be perceived as having a lower probability of being successful. Therefore, in accordance with CLT we posit that individuals will tend to have a more optimistic perception that a project risk can be successfully managed when the risk is construed in abstract terms rather than in concrete terms, and we propose the following hypothesis.

> *Hypothesis 1*. Individuals with high-level construal of a project risk will have a more positive perception of risk management success as compared to individuals with low-level construal of a project risk.

According to CLT, distant future planning, unlike planning for the near future, is guided by desirability concerns as opposed to feasibility concerns. Thus, an individual's evaluation of a risk management plan for a risk event in the distant future should be more affected by desirability rather than feasibility. However, an individual's evaluation of a risk management plan for a risk event in the near future should be more affected by feasibility concerns. Consistent with this line of reasoning, we theorize that a high-level risk construal will cause individuals to be more sensitive to desirability concerns than feasibility concerns. Conversely, we theorize that a low-level risk construal will cause individuals to be more sensitive to feasibility concerns than desirability concerns. Thus, we posit that individuals with a high-level risk construal will more sensitive to benefits in evaluating the relative merits of risk management plans for addressing the risk as compared to individuals with low-level construal of a project risk. Further, we posit that individuals with a low-level risk construal will be more sensitive to costs in evaluating the relative merits of risk management plans for addressing the risk compared to individuals with high-level construal of a project risk. Thus, we propose the following hypotheses:

> *Hypothesis 2A*. Individuals with high-level construal of a project risk will favor a risk management plan that confers higher benefits as compared to individuals with low-level construal of a project risk.
>
> *Hypothesis 2B*. Individuals with low-level construal of a project risk will favor a risk management plan that is less costly as compared to individuals with high-level construal of a project risk.

According to CLT, "pros (reasons for taking the action) constitute high-level, superordinate construals, whereas cons (reasons against taking the action) constitute low-level, subordinate construals" (Eyal et al. 2004, p. 782). This is because the subjective importance of cons depends on whether or not pros are present more than the subjective importance of pros depends on whether or not cons are present (Eyal et al. 2004). Using risk management to illustrate this, if we know that a risk mitigation management plan has some benefit, we would inquire about its deficiencies before making a decision. However, if the mitigation risk management plan has no benefits, we would decide against taking it without further inquiry about its deficiencies.

In a series of experiments, Eyal et al. (2004) found that participants generated more pros and fewer cons as temporal distance from the actions increased. Extending this line of inquiry, Herzog et al. (2007) showed that participants had more favorable attitudes toward the action when it was to occur in the distant future. In one of their experiments, people found it easier to generate pros if an action was associated with the distant rather than the near future. For cons, however, they found the reverse;

people found it more difficult to generate cons if an action was associated with the distant rather than the near future.

Consistent with this line of reasoning, we theorize that in the context of IT project risk management, individuals will generate more pros and fewer cons in evaluating a risk mitigation management plan that is presented in abstract rather than in concrete terms. In other words, CLT predicts that individuals will exhibit an optimism bias when a risk managementmitigation plan is construed in high-level terms. Thus, we propose the following hypothesishypotheses:

*Hypothesis 3A. Individuals with high-level construal of a risk management plan will identify more pros and fewer cons as compared to individuals with high low-level construal of a risk management plan.*

*Hypothesis 3B. Individuals with low-level construal of a risk management plan will identify more cons as compared to individuals with high-level construal of a risk management plan.*

# 5 Method

## 5.1 Participants and Design

Following an engaged scholarship approach (Van de ven, 2007) this study was conducted as a joint effort by a university research team and a technology company both located in Israel. The company has more than 600 employees, and focuses on developing security technologies. For this study, we recruited 183 employees who were working on a large-scale IT project. We selected an experiment as the method of choice in order to create a highly controlled setting that would allow us to examine the proposed relationship between construal levels and optimism bias in managing IT project risks. The experimental method is the most-frequently used research approach in the construal level literature (Liberman & Trope, 1998; Liberman, Trope, McCrea, & Sherman, 2007; Nussbaum, et al., 2006), and the optimism bias literature (Buehler, et al., 1994; Kahneman & Lovallo, 1993). Moreover, an experiment was deemed to be the best approach for examining CLT as a causal explanation for optimism bias in project risk management. Our experiment involved a 1x2 design in which we manipulated construal level to be either high or low.

## 5.2 Decision Task, Procedures, and Measures

Our experimental task involved evaluating a potential risk associated with the actual IT project in which the participants were involved. We chose "changes in user requirements" as the risk for the participants to evaluate, as managers in the company suggested that it was the most common project risk associated with the actual projects in their company. First, we manipulated construal level by instructing participants to state either 3 examples of how the risk of changes in user requirements will actually turn into a problem and affect project success (low-level construal) or 3 possible outcomes of the risk of changes in user requirements on project success (high-level construal). Participants were then primed with an example appropriate to the condition to which they had been assigned. The actual manipulations that were employed are shown in Appendix A[1]. Our manipulations were consistent with the manipulations used in prior construal level studies; for example, in a study by Liberman, et al. (2007) an abstract task instruction was given for the high-level construal group (proofread a paper)

[1] The experiment was conducted in Hebrew, and a translated version is presented in this paper.

and a specific task instruction was given for the low-level construal group (check the paper for spelling and typing errors).

Following the construal manipulation, participants were asked to answer a set of questions that were designed to assess optimism bias. First, participants were asked to answer four questions concerning their perception about successfully managing the project risk. Each question was measured on a 7-point likert scale (a complete list of measurement items is shown in Appendix B). Second, participants were asked to identify as many pros and cons as possible for a risk management plan to prevent the risk (changes in user requirements). Specifically, participants were asked to "state as many as possible pros and cons" for a plan to prevent – either "possible outcomes of the risk of changes in user requirements on project success" (the high-level construal group), or "changes in user requirements from actually turning into a problem and affect project success" (the low-level construal group). Lastly, participants were given two risk management plans for dealing with the project risk that differed slightly in their cost versus their benefit (one plan was more beneficial but required more resources, while the other plan was slightly less beneficial and required less resources). Participants were asked to indicate their preference for each plan on a 7-point scale. Following measures for optimism bias, participants were asked to indicate their IT project management work experience (in years).

# 6 Results

## 6.1 Hypothesis Testing

In order to test our hypotheses, we first created a composite variable comprised of the four measurement items used to assess perception of risk management success (Cronbach's alpha = .79). We then conducted an ANCOVA with construal level as the independent variable, perception of success as the dependent variable, and employee experience as a covariate (the average IT project management experience was 4.87 years (SD = 4.54)). Since experience could potentially influence optimism, we wanted to control for its effect[2]. The results of the ANCOVA indicated a significant main effect of construal level on perception of risk management success, $F(1,180) = 16.56$, $p < .001$, $\eta^2_p = .08$. As expected, participants in the high-level construal group (N = 102, M = 4.87, SD = .91) had a more optimistic perception about successfully managing the project risk than did participants in the low-level construal group (N = 81, M = 4.28, SD = 1.00) (Figure 1). These results provide support for Hypothesis 1.

Next, in Hypothesis 2A we posited that individuals with high-level construal of a project risk will have a stronger preference for a risk management plan that confers higher benefits (even if it costs more) as compared to individuals with low-level construal of a project risk. We further theorized in Hypothesis 2B that individuals with low-level construal of a project risk will have a stronger preference for a risk management plan that is less costly as compared with individuals with high-level construal of a project risk. In order to test these two hypotheses, we conducted two separate ANCOVAs.

[2] We performed a log transformation on experience before conducting the ANCOVA, as it did not follow a normal distribution.

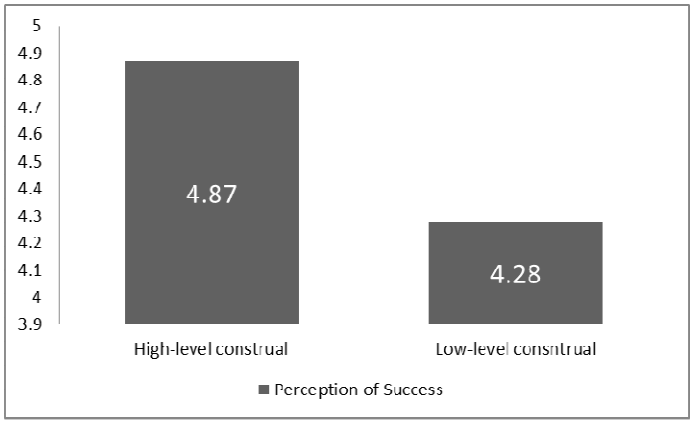



*Figure 1. Perception of Successfully Managing a Project Risk.*

First, we conducted an ANCOVA with construal level as the independent variable, preference for the more beneficial, but more costly risk management plan as the dependent variable, and employee experience as a covariate. The results of the ANCOVA indicated a significant main effect of construal level on preference for the more beneficial plan, $F(1,180) = 6.58$, $p = .011$, $\eta^2_p = .04$. As expected, participants in the high-level construal group (N = 102, M = 5.38, SD = 1.54) had a stronger preference towards the plan that yielded greater benefits even though it was more costly than did participants in the low-level construal group (N = 81, M = 4.77, SD = 1.70) (Figure 2). These results provide support for Hypothesis 2A. Second, we conducted another ANCOVA with construal level as the independent variable, preference for the less costly, but less beneficial risk management plan as the dependent variable, and employee experience as a covariate. The results of the ANCOVA indicated a significant main effect of construal level on preference for the less costly plan, $F(1,180) = 3.36$, $p = .07$, $\eta^2_p = .02$[3]. As expected, participants in the low-level construal group (N = 81, M = 5.28, SD = 1.34) had a stronger preference for the plan that was less costly but less beneficial (N = 102, M = 4.88, SD = 1.56) (Figure 2). These results provide support for Hypothesis 2B.

Finally, in order to test Hypothesis 3A, we conducted an ANCOVA with construal level as the independent variable, the number of pros associated with a risk management plan as the dependent variable, and employee experience and rank as covariates. In this analysis, we excluded participants who did not identify any pros associated with a risk management plan. The ANCOVA results indicated a significant main effect of construal level on the number of pros identified, $F(1,141) = 4.56$, $p = .03$, $\eta^2_p = .03$. As expected, participants in the high-level construal group (N = 81, M = 3.20, SD = 1.44) identified more pros associated with the risk management plan than did participants in the low-level construal group (N = 63, M = 2.71, SD = 1.20), thus providing support for Hypothesis 3A. Further, we conducted another ANCOVA with construal level as the independent variable, the number of cons associated with a risk management plan as the dependent variable, and employee experience and rank as covariates. In this analysis, we excluded participants who did not identify any cons associated with a risk management plan. The results indicated a significant main effect of construal level on the number of cons identified, $F(1,142) = 6.48$, $p = .01$, $\eta^2_p = .04$. As expected, participants in the low -level construal group (N = 64, M = 3.16, SD = 1.55) identified more cons associated with the risk management plan than did participants in the high-level construal group (N = 81, M = 2.60,

[3] These results were based on a two-tailed test, and Hypothesis 2B posited a particular direction (individuals with a low-level construal would have a greater preference for a less beneficial, but less costly plan as compared to individuals with a high-level construal). Thus, we divided the significant level by 2(.07/2=.035), and concluded the main effect to be significant

SD = 1.10), thus providing support for Hypothesis 3B (see Figure 3). Together, these results suggest that high-level construal of a project risk leads to a more positive evaluation of a risk management plan (more pros and fewer cons) compared to low-level construal of a project risk, thus providing support for Hypothesis 3.

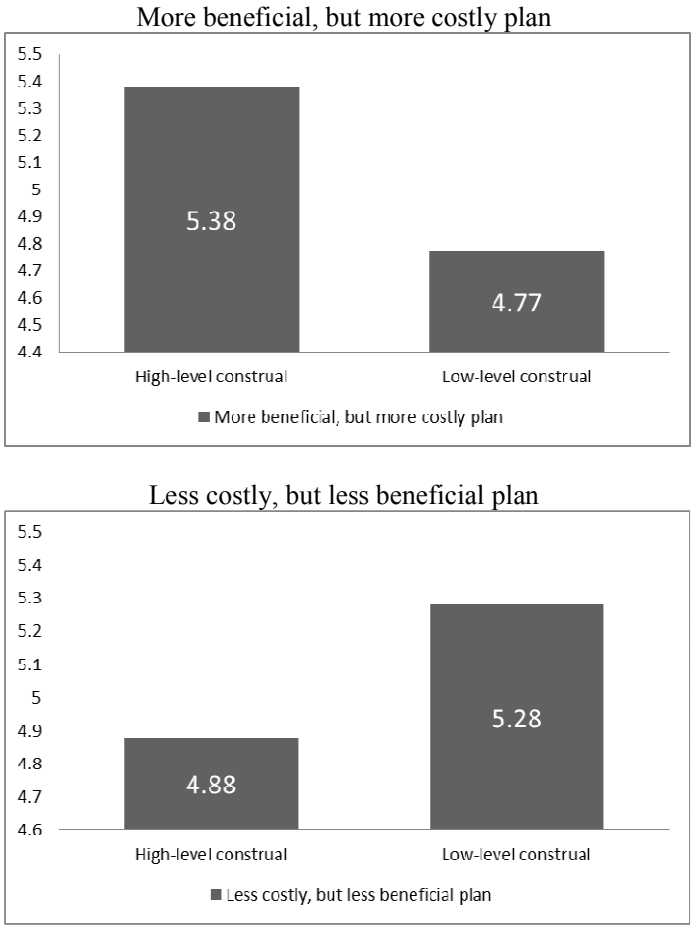
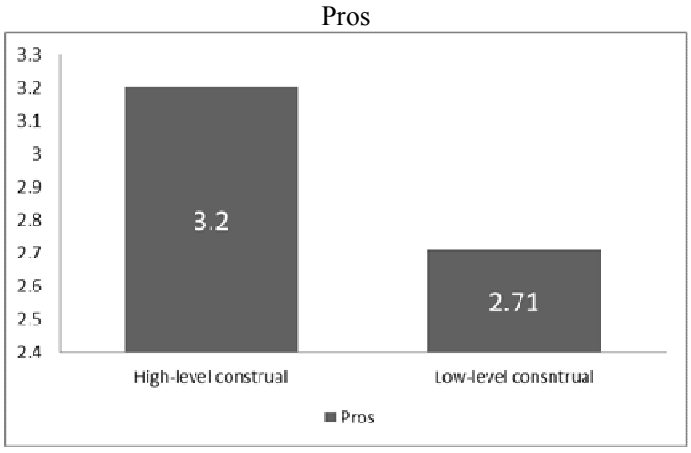



*Figure 2. Preferences Regarding Risk Management Plans*



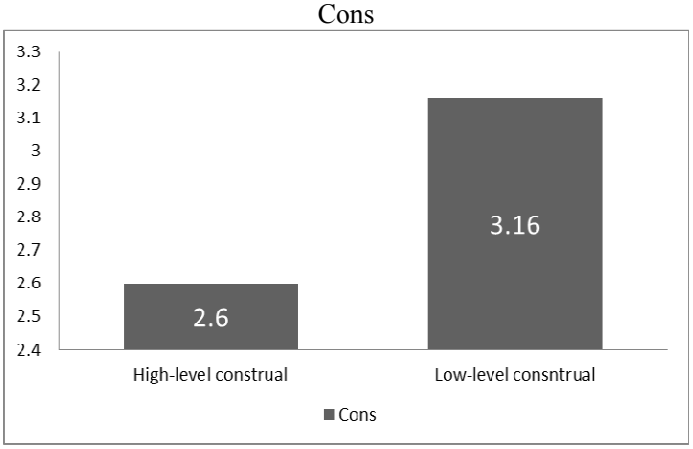



*Figure 3. Pros and Cons Associated with a Risk Management Plan*

# 7 Discussion and Implications

Project risks can adversely affect both process and product outcomes in IT projects (Wallace & Keil, 2004; Wallace, et al., 2004). Project risk management involves anticipating and controlling potential future events that can adversely affect project success (Barki, et al., 1993, 2001; Boehm, 1991; Schmidt, et al., 2001). Prior research in this area has focused largely on checklists: e.g., (Schmidt, et al., 2001), frameworks: e.g., (McFarlan, 1981), simple tools: e.g., (Tiwana & Keil, 2004), and survey instruments: e.g., (Barki, et al., 1993; Wallace, et al., 2004) designed to help identify individual risks and to aid in the assessment of the overall risk level of an IT project. While such work has certainly advanced our understanding of IT project risk management and provided some value to practitioners, it has failed to provide a theoretical explanation as to why organizations often fail to follow recommended risk management practices and why people tend to be so optimistic when it comes to their ability to manage risk. In this study, we suggested that cognitive bias (i.e., the fact that people are prone to making systematic decision errors in uncertain situations (Tversky & Kahneman, 1974)), has significant implications for project risk management that remain largely unexplored.

Motivated by this gap in the literature, we investigated a particular type of cognitive bias (i.e., optimism bias) that we believe is highly relevant to project risk management and drew upon construal level theory to understand how this bias may affect risk management. We suggested that risk management is centered on anticipating uncertain future events (i.e., project risks), and that optimism bias is most likely to appear when individuals deal with uncertain future events (Weinstein, 1980). The findings from our experiment showed that abstract, high-level construal of a project risk induces greater optimism in managing project risks than concrete, low-level construal of a project risk. More specifically, we found that a high-level construal of a project risk leads individuals to have an optimistic perception about their ability to successfully manage the project risk. We also found that individuals with a high-level construal of a project risk tend to focus more on benefits than on costs in evaluating a risk management plan. Finally, we observed that individuals with a high-level construal identified more pros associated with a risk management plan than did participants in the low-level construal group. These findings have important implications for both research and practice, but before discussing these, it is appropriate to consider the limitations of our study.

## 7.1 Limitations

In order to investigate the impact of construal level on IT project risk management decisions, we selected an experiment as the method of choice because it allowed us to create the kind of highly controlled setting that is conducive to investigating causal relationships. The experimental approach has been widely used in research on judgment and decision-making, including the Nobel prize-winning work of Kahneman and Tversky (1979). While experiments are sometimes criticized due to perceived weakness in terms of external validity, they offer a level of internal validity that is unparalleled relative to other research methods.

This tradeoff of higher internal validity and lower external validity is commonplace in experiments and should not necessarily be construed as a weakness. As noted by Cook and Campbell (1979), "jeopardizing internal validity for the sake of increasing external validity usually entails a minimal gain for a considerable loss." Experimental designs should therefore be evaluated on whether they are likely to increase our understanding of human behavior, not on whether they mimic organizational settings (Dobbins, Lane, & Steiner, 1988).

Another common criticism regarding experiments is the heavy reliance on student subjects who are frequently viewed as lacking the relevant knowledge and experience to be in a position to respond meaningfully to the experimental situation. In this regard, it is important to note that unlike the traditional laboratory experiment involving student subjects, our design involved the recruitment of 183 employees who were working on a large-scale IT project at a company. Thus, all of our participants were intimately familiar with the actual project used in the experiment as well as the organization's risk management practices. Situated experiments of this type are designed to optimize "the strengths of both laboratory and field experiments in organizational research while mitigating the weaknesses of each" (Greenberg & Tomlinson, 2004, pp., p. 703). Since we executed our experiment in an organizational field setting, we were able to maximize the benefits of having realistic conditions, while simultaneously achieving the high internal validity that is a recognized and valued feature of laboratory experiments.

Still, we acknowledge that like any method, experiments have limitations, and that further research is warranted to replicate and extend the findings of this study using different research methods, such as survey or case study.

## 7.2 Implications for Research

As noted earlier, prior research on IT project risk management, though valuable, has tended to be largely a-theoretical. The primary contribution of our study is that it offers a theoretical explanation regarding how one type of cognitive bias (i.e., optimism bias) may affect IT project risk management. In this regard, our study brings a fresh theoretical perspective based on construal level theory, and offers an explanation as to why individuals may become overly optimistic about managing project risks.

This study also contributes to our understanding of optimism bias in IT project management. To date, prior research on optimism bias has largely focused on comparative optimism (Chambers & Windschitl, 2004; Helweg-Larsen & Shepperd, 2001; Weinstein, 1980) as the key mechanism underlying this cognitive bias. However, the comparative optimism perspective does not provide a good explanation of optimism bias in the context of IT project risk management (which does not necessarily involve comparative judgment). Similarly, the planning fallacy (i.e., the tendency to overestimate the pace at which we will complete tasks (Buehler, et al., 1994), which is closely related to optimism bias does not explain why project managers tend to underestimate the risks associated with complex projects or become overly optimistic regarding their ability to manage such risks. By drawing upon construal level theory (CLT) (Trope & Liberman, 2010), we provide a fresh theoretical

perspective to further our understanding of optimism bias, particularly as it relates to temporal decisions such as those related to IT project management.

While the present study focused on optimism bias in managing IT project risks, we believe that construal level theory has the potential to provide fresh insights on optimism bias in other decision settings, particularly in project planning. Specifically, a well-known, chronic problem in project planning is people's tendency to develop overly optimistic estimates of project costs or completion time (i.e., the planning fallacy). In explaining this phenomenon, Lovallo and Kahneman (2003) suggested that such optimistic estimates occur because decision makers ignore the details of a project that can negatively influence the project. Further, prior research has suggested that project estimates can become more accurate when decision makers base their estimates on the actual outcomes of similar projects that have already been completed (i.e., concrete information) as opposed to basing them solely on future plans of a project (Flyvbjerg, 2008; Kahneman & Tversky, 1979). These findings are very consistent with a CLT theory perspective. In this paper, we theorized that an abstract construal of a project risk leads to optimism as it does not capture specific potential incidents that may be associated with the risk. In contrast, we theorized that a concrete construal of a project risk retains detailed features of the risk, and is thus less likely to cause optimism. We believe that this same CLT theory perspective can help to explain the planning fallacy.

The application of construal level effects in real life projects, offers a fruitful ground for additional theory testing of risk decisions. The results of our study provide implications for risk management judgment and choice, pointing to overall decisions of planning and prediction. A knowledgeable use of the effects of psychological distance may guide future research and improve risk management performance in related areas, such as escalation of commitment (Keil et al. 2007), risk response procrastination (McCrea et al. 2008), time and cost estimation (Flyvbjerg, 2008) and many more aspects of project risk decision-making.

## 7.3 Implications for Practice

Project risks can represent a major threat to the successful completion of IT projects (Wallace & Keil, 2004), and recent studies continue to show that inability to anticipate and manage project risks is a major cause of project failures (e.g., Flyvbjerg and Budzier (2011)). While there have been significant advances in tools and techniques for identifying IT project risks, project risk management remains a challenge, as human beings are susceptible to cognitive biases that can impair their ability to exercise good risk management practices. The findings of our study underscore the fact that optimism bias can affect people's ability to perceive and manage IT project risks. Specifically, our findings suggest that an abstract representation of a project risk tends to lead to more optimism, compared to a concrete representation of a project risk. Thus, we suggest that people should evaluate project risks in concrete, low-level terms, which retain detailed features of the risks and help bring to mind specific problems associated with risk materialization that could negatively influence project success. Such an approach may help limit optimism bias in managing project risks. Conversely, when it comes to choosing a risk management plan, it appears that a more abstract conceptualization will help ensure that managers focus on the benefits rather than the costs associated with implementing such a plan, thus enabling them to invest a higher level of resources in risk mitigation.

Perhaps the most important implication for practice that stems from our study is the understanding that how individuals construe risk can potentially influence not only their level of optimism in terms of dealing with IT project risks, but also their willingness to invest in the kind of risk management plans needed to reduce the chances of project failure.

# 8 Conclusion

Project risk management is an integral element of IT project management. While tools and techniques can help project teams identify and assess project risks, it is equally if not more important to understand the cognitive biases that may inhibit people from properly using these tools and from forming overly optimistic views regarding their abilities to manage the risks that can bring down a project. This study sheds a light on a particular type of cognitive bias, optimism bias, in the context of IT project risk management by drawing upon construal level theory to provide a fresh theoretical perspective. Since risk management is a generic process exercised in many domains as managers identify and act on uncertainties related to the success of their endeavors, we believe that our work may have broad implications that extend beyond the context of IT project risk management. We suggest that risk construal affects risk management decisions. When defining risks more generally, or in the distant future, risk management decisions are susceptible to optimism bias due to elevated perceptions of success. Considering both the importance and challenge of risk management, we hope that our study opens the door to a new line of research that will deepen our theoretical understanding of risk management and provide a vehicle for improvement in this area.

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# Appendix A

Project XX:
Like other projects, there is a potential for risks that may affect the project success. Consider the risk of changes in user requirements.

[Low Construal Level (LCL):]
Please state 3 examples of how the risk of changes in user requirements will actually turn into a problem and affect project success.
(For example: an addition of new operational scenarios will require design changes verification, leading to development time overruns).

[High Construal Level (HCL):]
Please state 3 possible outcomes of the risk of changes in user requirements on project success. (For example: addition of new requirements leading to time overruns).

*Table A-1. General instructions and manipulation.*

## Appendix B

| | |
|---|---|
| perception about successfully managing the project risk | I can succeed in managing the risk<br>I can prevent the risk from becoming a problem<br>I can prevent technical performance issues due to the risk<br>I can prevent time delays due to the risk |
| preference for risk management plans | Option 1:<br>recruiting a user group to be incorporated in system development and implementation; extended knowledge of requirements; higher cost<br><br>Option 2:<br>performing a preliminary user field experiment to best define operational requirements in real scenarios; sufficient knowledge of requirements; lower cost |
| pros and cons that are associated with a potential risk management plan | Please state as many as possible pros and cons for a plan to prevent:<br>[HCL] possible outcomes of the risk of changes in user requirements on project success<br><br>[LCL] changes in user requirements from actually turning into a problem and affect project success. |

*Table B-1. Measures.*