


Summer 7-1-2016

Reflecting on Performance Feedback: The Effect of Counterfactual Thinking on Subsequent Leader Performance

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REFLECTING ON PERFORMANCE FEEDBACK: THE EFFECT OF
COUNTERFACTUAL THINKING ON SUBSEQUENT LEADER PERFORMANCE

by
Kelly R. Hall

A Dissertation

Presented in Partial Fulfillment of Requirements for the
Degree of
Doctor of Business Administration
In the
Coles College of Business
Kennesaw State University

Kennesaw, GA
2016

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ACKNOWLEDGEMENTS

The pursuit of this degree has taught me many things, both academically and personally. Among its most important lessons is that the bonds of family are demonstrated not in good times but in the face of challenge. My husband, Reese, has made many sacrifices to support my goals, and his patience and encouragement have never wavered. He has always been there to celebrate my successes and to keep me grounded during times of struggle. I thank him for his enduring love and support, the many ways in which he has helped me realize my potential, and for being my constant companion and friend.

My children, David and Holly, have been my continuous source of inspiration. Not only have they too made sacrifices, but they have also been incredibly understanding and patient during this process. They taught me the power of seemingly small words, and I thank them for the many times they said “good luck,” “great job,” and “it will be ok.” They motivated me to push through the most difficult days.

My husband and children’s support have been matched only by that of my parents, Jan and Rick Balota. I thank them for their living lessons on the importance of a strong work ethic and perseverance. I appreciate the many times my mom listened to my ideas and offered unique insight and encouragement. I thank my dad for the remarkable and countless sacrifices he has made for his children, as well as for his words of wisdom.

My parents' unfailing devotion and commitment to family have enabled me to attain this goal and to excel in life.

I have also come to understand that there is no substitute for faculty who genuinely care about the success of their students and are committed to going the extra mile to help students succeed. I owe a special thanks to my committee chair and mentor, Dr. Neal Mero. His support has surpassed anything that I could have expected. I thank him for supporting my vision and encouraging me during the most challenging aspects of this project. Through his mentorship, I have learned many valuable lessons, and I appreciate all he has done to support me within and beyond this program. Likewise, I am indebted to my committee members, Dr. Robin Cheramie and Dr. Steve Werner, as well as all of the DBA faculty and Global Scholars who have contributed to my growth and development. Similarly, many faculty members contributed to this research by offering recommendations, serving as expert judges, and assisting with participant recruitment. I greatly appreciate their time and support.

I thank my cohort members and friends with whom I have shared this journey. I would like to extend a special thanks to Dana Harrison and James Smith whose friendship, assistance, and laughter during this program have been invaluable. I thank Dana for walking alongside me and for sharing the joys, excitement, and challenges of this endeavor. I thank James for the support, encouragement, and suggestions during times of frustration and uncertainty. Likewise, I thank Shawn Wilson for his time and assistance with critical tasks associated with this project. Finally, I thank my many cohort members who served as expert judges and assisted with various dissertation tasks. I

appreciate the friendships I have made in this program, and I count them among my many blessings.

I am also grateful to the friends and family who contributed to this research by serving as actors and crewmembers. I am incredibly thankful for the help of Reese Hall, David Hall, Jim McMillan, Kelly Moore, Ameret Carlson, Brandon Wilhoit, Reggie Oates, Ryan Johnson, Joyce Armijo, Gabriella Ochsenfeld, and Tamara Stanger. I am also grateful to Dennis and Nicole Roehl for their willingness to allow me the use of their business facilities for filming purposes.

Finally, I would like to thank my colleagues at Stetson University for their support. I appreciate their complete confidence and their ongoing encouragement throughout this endeavor. I am thankful to have had such a tremendous support system.

DEDICATION

I dedicate this dissertation to the one who taught me how to push the limits and to be graceful under pressure—to the loving memory of my best friend and grandmother,

Betty Jo Reese.

ABSTRACT

REFLECTING ON PERFORMANCE FEEDBACK: THE EFFECT OF COUNTERFACTUAL THINKING ON SUBSEQUENT LEADER PERFORMANCE

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Performance feedback is an integral aspect of facilitating employee learning. Despite its importance, research suggests that when that feedback conveys a performance discrepancy, subsequent performance does not improve. Researchers have advanced reflection as a strategy for increasing feedback effectiveness and have established its value for learning and performance improvement. However, these studies have not accounted for the effects of specific types of reflection on performance. To this point, the current research examines the role of one form of reflection, counterfactual thinking, for learning after performance discrepancies. I explored boundary conditions that might influence self-focused upward counterfactual thinking—a form of reflection particularly important for learning and performance improvement—and examined whether and when such thinking influences the relationship between a baseline performance discrepancy and subsequent performance. To investigate these issues, I designed, developed, and validated a computer simulated leadership skills task and administered it to graduate and undergraduate students (N= 169) in a web-based research setting. I tested the proposed relationships using conditional process analysis. The results of this study demonstrated that when individuals encounter performance discrepancies they might attempt to

reconcile such through self-focused upward counterfactual thinking. This research represents a step toward an improved understanding of reflection, performance discrepancy feedback processing, and subsequent performance effects.

Keywords: Counterfactual thinking, performance feedback, reflection, simulations.

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CHAPTER 1: INTRODUCTION

Employee learning has important consequences for individual thought and behavior. Employee learning is also vital to the success of an organization; it is considered a prerequisite for organizational adaptability and competitiveness (Maurer, Pierce, & Shore, 2002). Due to its importance, companies devote significant resources to learning. For example, in 2012, organizations in the United States invested \$164 billion in learning initiatives (Miller, 2013).

One of the most integral aspects of facilitating employee learning is providing feedback (Kuchinke, 2000). Feedback is any information regarding the effectiveness of an individual's behavior (Ilgen, Fisher, & Taylor, 1979). Although feedback is ubiquitous in organizations (Kinicki, Prussia, Wu, & McKee-Ryan, 2004), there are multiple characteristics that can make any one instance of feedback unique. For example, feedback may convey goal attainment (i.e. positive feedback) or it may convey a performance discrepancy (i.e. negative/corrective feedback) (Ilgen et al., 1979). Recent findings suggest that up to 90% of employees believe that receiving feedback about their performance discrepancies is critical for performance improvement, and more than 50% indicate they would prefer to receive such feedback to praise (Zenger & Folkman, 2015). While many employees prefer corrective feedback, and it is vital for organizations to provide it to employees, there is little evidence that providing such feedback actually

leads to performance improvement (e.g. Anseel & Lievens, 2006; Kluger & DeNisi, 1996).

The influence of feedback on performance has been investigated for nearly a century (Arps, 1917), and we know that when individuals encounter performance discrepancies, they may respond with self-enhancement strivings. Self-enhancement strivings are strivings that drive individuals to protect themselves from threatening information (e.g. corrective feedback) and increase favorable self-views (Sedikides & Strube, 1997). Self-enhancement strivings may lead one to dismiss corrective feedback, which can inhibit learning processes and subsequently maintain or lower performance levels (Anseel & Lievens, 2006; Kluger & DeNisi, 1996). Thus, it is important to identify strategies that reduce such strivings and increase feedback effectiveness (Kinicki et al., 2004). To this point, encouraging feedback recipients to actively process and elaborate on feedback has been proposed as a way to reduce self-enhancement strivings and to increase the acceptance of unfavorable feedback (Anseel & Lievens, 2006).

Recently, scholars have positioned reflection as a learning intervention that can help employees process feedback and experiences, thereby increasing the likelihood of learning, behavior change, and performance improvement (e.g. Anseel, Lievens, & Schollaert, 2009; DeRue, Nahrgang, Hollenbeck, & Workman, 2012; Ellis, Carette, Anseel, & Lievens, 2014). Reflection has long been regarded as a critical component of the learning process (Dewey, 1933). Through probing cause and effect, questioning assumptions, and analyzing the meaning of experiences, one can increase his or her

awareness of personal experiences and therefore his or her ability to learn from those experiences (Ashford & DeRue, 2012; Hullfish & Smith, 1961). Scholars have found positive effects of reflective techniques in the feedback-performance relationship (e.g. Anseel et al., 2009; Ellis et al., 2014; Villado & Arthur, 2013). Such findings have been reported for individual written reflection strategies and structured group reflections (e.g. after-event-reviews).

Despite the positive effects of reflection on learning, we know little about situational and contextual factors that support or hinder reflection in the workplace. To better understand the effects of reflection on employee learning and its role in feedback processing, I suggest that it is important to identify boundary conditions that prompt individuals to reflect and those that may accentuate or attenuate the effects of reflection on performance. Extant literature offers limited insight into such issues as of yet. Thus, the conceptual basis for evaluating learning through reflection is incomplete.

The purpose of the current research is to offer a more complete picture of the effects of reflection. To this end, I will explore counterfactual thinking, a form of reflection that has received insufficient attention in management studies (Ellis et al., 2014), as well as its effects on a key learning outcome, performance. Counterfactual thoughts are mental representations of alternatives to past events, actions, or states (Byrne, 2005; Roese, 1997). Prior management studies (e.g. Anseel et al., 2009; DeRue et al., 2012; Ellis & Davidi, 2005; Ellis, Ganzach, Castle, & Sekely, 2010; Ellis, Mendel, & Aloni-Zohar, 2009; Ellis, Mendel, & Nir, 2006) have not empirically examined how

counterfactual thoughts influence the ways in which one learns from and responds to feedback and experiences; yet, it is important to do so.

Counterfactual thinking is a core feature of human cognition (Sanna & Chang, 2003). Neural networks monitor counterfactual experiences and outcomes—similar to the monitoring of direct experiences (Platt & Hayden, 2011). When individuals engage in reflection, they not only consider what they did do, but also what *could* or *should* have been done (Epstude & Roese, 2008). Counterfactual thoughts can enhance awareness of what could have ensued from alternate behavioral choices (Boorman, Behrens, & Rushworth, 2011). This is important because, often, performance is improved by altering past performance strategies (Ilgen & Davis, 2000). Therefore, I argue that counterfactual thinking, which can illuminate such strategies and enhance motivation, warrants empirical attention.

Though not empirically examined in extant management literature, the potential value of counterfactual thinking has been acknowledged by management scholars (Ellis et al., 2014). Specifically, counterfactual thinking is thought to help learners overcome perception biases and adjust mental models. These same scholars, as well as others (DeRue et al., 2012), highlight the need to better understand how counterfactual thinking contributes to reflective learning and development. Furthering this understanding will not only provide insight on cognitive mechanisms that influence how one learns from feedback; it is also expected to provide insight on how to improve responses to corrective

feedback that conveys performance discrepancies, an important issue to researchers and managers alike.

To these points, it is important to consider whether reflecting on alternate courses of actions reduce dismissal of such feedback and, instead, lead to performance improvement. Likewise, it is important to consider what determines whether the recipient will act on lessons learned to improve performance. To address these questions, I argue that scholars must look beyond constructs considered in traditional feedback process models (Fedor, Davis, Maslyn, & Mathieson, 2001; Ilgen et al., 1979; Kluger & DeNisi, 1996; Nadler, 1979). While there is empirical support for a fundamental proposition of such models (i.e. individuals go through a series of cognitive evaluations before responding to feedback), the models have been better predictors of responses to favorable feedback than to unfavorable feedback (Kinicki et al., 2004). Thus, when examining corrective feedback that highlights performance discrepancies, other cognitive processes must be considered.

Scholars contended that when individuals encounter corrective feedback on performance discrepancies, they will work harder (e.g. expend more effort, persist, and focus on the task) if the feedback triggers motivational processes (Kluger & DeNisi, 1996). Many times, it does not. Moreover, most individuals will not try to determine why their performance strategies failed or generate ideas for improved performance, until after they have exhausted a 'work harder' strategy (Kluger & DeNisi, 1996). Here, we see an inherent challenge of corrective feedback. If we struggle to get individuals to work

harder when they encounter a performance discrepancy, how then, can we get them to work smarter?

I suggest that, when prompted to reflect on alternate behaviors and work strategies, as well as potential outcomes of such, it may help individuals overcome the breakdown that frequently occurs between the receipt of corrective feedback and intentions to respond to the feedback. I propose to integrate established theory from the psychology field—the functional theory of counterfactual thinking (Epstude & Roese, 2008)—to investigate how counterfactual thinking influences feedback processing and subsequent performance.

The current research will contribute to both the reflective learning and feedback literatures. This research untangles counterfactual thinking from other aspects of reflection, such as self-explanation, wherein learners explain behaviors they did implement. Past management research has not accounted for the unique impact of counterfactuals on performance and, to date, reflection studies in the management literature have largely emphasized conversational forms of reflection such as after-event-reviews (e.g. Ellis et al., 2014). Contextual factors, expected to exert distinct effects on counterfactual generation, are also investigated. The result is expected to be an improved understanding of reflection processes and effects on performance. Finally, the current research considers the indirect effect of counterfactual thinking in processing feedback that conveys performance discrepancies, which is expected to reduce the dismissal of such feedback and lead to improved performance.

CHAPTER 2: LITERATURE REVIEW

To better understand how reflection can influence feedback processing and learning, this research examines the effects of counterfactual thinking on learning following performance discrepancies. In this chapter, I will present a review of learning literature and propose a model that focuses on boundary conditions that influence counterfactual thinking and when such thinking affects task performance. Specifically, chapter two is organized into five sections.

The first section provides a review of the feedback literature with an emphasis on the functions of feedback, its effects on performance, two feedback characteristics—sign and specificity, as well as feedback process models. The second section reviews reflection, particularly its contribution to learning and how reflection has been integrated into management studies. In the third section, I narrow down to a specific form of reflection, counterfactual thinking, and provide a detailed review of findings from the psychology literature. The fourth section presents the functional theory of counterfactual thinking to illustrate how counterfactuals can impact how individuals may process feedback that conveys performance discrepancies and subsequent behaviors. The last section includes the proposed boundary conditions that influence counterfactual thinking, as well as its effect on performance, and I advance the conceptual framework through the development of hypotheses.

Feedback

Feedback is ubiquitous in organizations (Kinicki et al., 2004), and it is a core job characteristic according to Hackman and Oldham's (1976) theory of work design (Hackman & Lawler, 1971; Hackman & Oldham, 1976). It has been defined as any information regarding the effectiveness of an individual's behavior (Ilgen et al., 1979). Feedback may be initiated by an external agent (e.g. manager, supervisor, etc.), or individuals may proactively seek feedback by monitoring the environment or requesting feedback (i.e. feedback inquiry) (Ashford & Cummings, 1983; Kluger & DeNisi, 1996). Receiving feedback is important; it provides critical information about employees' work behaviors. For instance, feedback helps employees know if their behaviors are correct, accurate, and adequate (Bourne, 1957; Earley, Northcraft, Lee, & Lituchy, 1990). Thus, feedback reduces uncertainty and signals the relative importance of goals in a workplace (Ashford & Cummings, 1983). Through feedback, employees can gain information about performance outcomes (i.e. outcome feedback) and on strategies used to obtain the outcomes (i.e. process feedback) (Earley et al., 1990).

Functions of Feedback.

Feedback serves multiple purposes, including directive, incentive, and motivational functions (Payne & Hauty, 1955; Vroom, 1964). Most individuals, at some point, have lacked clarity in their jobs. By providing direction and clarifying roles, feedback can help employees overcome this challenge. Similarly, employees may find

themselves questioning the need to engage in certain behaviors or thinking ‘what’s in it for me?’ The incentive function of feedback addresses such issues by signaling expected payoffs for engaging in various workplace behaviors. Feedback can also ignite motivation processes, as it contains referent information that can help employees meet goals (Herold & Greller, 1977), as well as higher-order needs (Deci & Ryan, 1992; Hackman & Oldham, 1976). By providing performance discrepancy information and increasing employees’ awareness of their performance, feedback can influence self-efficacy (Bandura & Cervone, 1983), goal commitment (Latham & Locke, 1991), and can provide employees with a sense of accomplishment and personal control over their jobs (Deci, 1975; Earley et al., 1990). The numerous effects of feedback make it an important organizational and individual resource that has meaningful implications for learning and performance in the workplace (Ashford & Cummings, 1983).

Feedback Characteristics: Sign and Specificity.

Although feedback is common in organizations, there are a number of characteristics that make any one instance of feedback unique. Feedback sign and feedback specificity are two such characteristics. Feedback sign refers to the extent to which the feedback is positive (i.e. favorable; goal attainment) or negative (i.e. unfavorable; performance discrepancy) (Ilgen et al., 1979). Feedback specificity refers to the level of information presented in the feedback message (Goodman et al., 2004; 2011). In the following sections, I will review these two feedback characteristics.

Feedback sign. The sign of feedback captures its positive or negative nature. This feedback characteristic has received a substantial amount of scholarly attention (Kluger & DeNisi, 1996). Through such efforts, researchers have determined that sign can affect many outcomes, including a recipient's performance, recollection, perceptions of accuracy, and the overall processing of feedback (Fedor et al., 2001; Ilgen et al., 1979; Kluger & DeNisi, 1996; Smither, Brett, & Atwater, 2007). An example of this can be seen in Smither et al.'s (2007) study. These scholars examined recipients' recollection of feedback, nine months following the feedback intervention, and found that individuals were able to recall positive feedback more than negative feedback. This may be the result of individuals' tendencies to deny and reject negative feedback (Ilgen et al., 1979).

As may be expected, individuals typically view positive feedback more favorably than negative feedback. This assessment can impact one's mood, such that favorable feedback commonly leads to positive affect and unfavorable feedback leads to negative affect (Ilgen et al., 1979). Recognizing that mood may, in turn, influence the receipt of feedback, researchers turned their attention to this relationship.

In a social perception task experiment, Ingram (1984) primed participants with positive and negative moods to determine the impacts on processing favorable and unfavorable feedback. Findings revealed that mood and favorability interact to influence how feedback is processed. Those primed with a negative mood experience prior to receiving unfavorable feedback, had longer reaction times and recalled more of the feedback than those who were not primed. Ingram argued that for feedback to be fully

processed and comprehended, it must be processed at a deep level. In Ingram's study, this was facilitated by ensuring subjects were presented with mood-consistent feedback details (Bower, 1981). In other words, individuals were presented with unfavorable feedback when they were in negative moods, thus there was an alignment between mood state and feedback sign.

Although Ingram's study provided insight regarding the influence of mood on feedback processes, these effects are not invariable. In fact, the relationship is believed to be quite complex and, in some cases, moods have no impact or may have mood-incongruent effects. For example, negative moods, resulting from unfavorable feedback, may lead to increased motivation, while the reverse being true for positive moods (for a detailed discussion of the affect infusion model see Forgas & George, 2001). Basically, what is relevant is that information processing strategies can impact the magnification, elimination, or reversal of transient mood states that influence the receipt of feedback (Forgas, 1995).

Kluger and DeNisi (1996) reviewed research on the inconsistent effects of feedback sign on performance and offered a theoretical explanation for how feedback sign may lead to varying outcomes. According to these scholars, positive feedback may signal that an opportunity for self-enhancement is present which can result in task-motivation processes. Through these processes, the feedback recipient can be prompted to raise the standard for performance and to improve future performance. Alternatively, feedback can also attenuate performance effects. Kluger and DeNisi (1996) suggest that

attenuation effects occur when feedback shifts attention to oneself, affective reactions, or framing effects. They argue that these attentional shifts deplete cognitive resources, hinder performance, and may cause the feedback recipient to maintain the performance standard, rather than seeking a higher performance goal. These effects are concerning, especially in the case of a performance discrepancy, as feedback details and the development of alternative work strategies for performance improvement fade into the background of one's thought processes (Kluger & DeNisi, 1996).

Krenn, Würth, & Hergovich (2013) found support for some of Kluger & DeNisi's (1996) theoretical arguments. During a selective attention task, participants were given the option to raise the task difficulty level following feedback. Those who received positive feedback were more likely to raise the standard; whereas, those who received negative feedback were more likely to maintain the standard. Yet, interestingly, when performance scores from round one and round two of the study were compared, there were no significant performance improvements for those who chose to raise the performance standard following negative feedback. It appears that, perhaps, subjects had the motivation to increase the standard, though they lacked a performance improvement strategy. Other subjects, who chose to maintain the standard (i.e. the task difficulty level) following negative feedback, also struggled with subsequent performance efforts. For these individuals, performance levels across rounds remained constant and, in some cases, worsened. Ultimately, while feedback sign provides important cues about task-goal

discrepancies, empirical findings on the effect of feedback sign on performance have been inconsistent (Kluger & DeNisi, 1996).

Feedback specificity. Feedback can vary based on the level of information presented in the feedback message, otherwise known as feedback specificity (Goodman et al., 2004). Earley et al. (1990) compared the effects of varying levels of feedback specificity during a stock investment simulation. More precisely, they assessed how such influences the relationships between feedback and goal-setting, self-confidence, effort, and appropriateness of information search. Their study showed that specific feedback rather than less specific feedback, appeared to be a more effective way to shape one's task strategy. Fedor (1991) supported this position and argued that specific feedback prevents uncertainty about how individuals should respond to the feedback.

Despite support for the value of specific feedback, Kluger and DeNisi (1996) suggested that the effects of feedback specificity are less clear. They argued that while there does appear to be a link between feedback specificity and learning, one should not assume that specific feedback always leads to learning, as empirical data suggest otherwise. In some cases, feedback can be too specific and/or the specific information may conflict with the recipient's natural cognitive representation of the task. As a result, specific feedback may impede learning and performance (Kluger & DeNisi, 1996). This presents a challenge for those tasked with providing feedback—low feedback specificity may leave the recipient feeling uncertain, while high specificity may hinder learning processes.

Research by Davis, Carson, Ammeter, & Treadway (2005), as well as Goodman and colleagues (2004, 2011), further highlight the complexities of feedback specificity. Davis et al. (2005) found that specific feedback was more effective for those with a performance goal orientation, whereas it was less effective for those with a learning orientation. Feedback specificity has also been shown to negatively impact exploratory behavior, learning, and transfer of training (Goodman et al., 2004, 2011). From this research, one may question if less specific feedback is more beneficial in situations that call for corrective action (e.g. performance discrepancies).

Feys, Anseel, & Wille (2011) revealed findings that may help to answer such a question. These scholars examined the influence of feedback specificity on initial feedback reactions—a critical component of feedback processing. They found that unfavorable reactions to negative feedback were more pronounced as information specificity increased. Based on this finding, Feys et al. cautioned the use of high specificity feedback and suggested that less specific feedback, combined with guided reflection, may be more beneficial for recipients of unfavorable feedback.

In spite of the contradictory findings regarding the benefits of specific feedback, managers are still trained and encouraged to give specific feedback (Goodman et al., 2004; Tyler, 2012). Could this practice actually be hindering the learning and development of current and future leaders? To consider this possibility, it is important to review how employees process feedback.

While the focus throughout this section has been on feedback sign and specificity, some details of feedback processing have emerged. In the following section, I will elaborate on feedback process models and provide a richer understanding of the cognitive steps one is believed to go through upon receiving feedback.

Feedback Process Models.

Feedback is not a simple stimulus (Ilgen et al., 1979), nor is the overall feedback process. Scholars have identified cognitive processes that are believed to mediate the relationship between the receipt of feedback and the response to feedback. While there are multiple theoretical models that present this process (e.g. Fedor, 1991; Ilgen et al., 1979; Kluger & DeNisi, 1996; Taylor et al., 1984), I will review two—Kluger & DeNisi's (1996) model and Ilgen et al.'s (1979) model.

I limit the review to the aforementioned models for specific reasons. Although, Kluger & DeNisi's model, compared to other models, is complex and less amendable to advanced statistical processes (Kinicki et al., 2004), it does provide theoretical arguments that are specific to learning. Because learning is a focal point of the current study, Kluger and DeNisi's arguments are worth noting. Similarly, Ilgen et al.'s model can also add value to the current discussion. It is the foundation of the other feedback process models and a parsimonious representation of the cognitive steps in the feedback process. Moreover, Ilgen et al.'s model has undergone a longitudinal examination (Kinicki et al., 2004), wherein the mediating role of cognitive variables in the feedback process was

empirically tested using covariance structure analysis. In contrast, variables from other models (Fedor et al., 1991; Taylor et al., 1984) have been used in bivariate studies, and the evaluation of psychometric properties of the variables in such studies has been less robust (Kinicki et al., 2004).

Kluger & DeNisi's (1996) feedback intervention theory. Recall that Kluger & DeNisi conducted a meta-analysis that revealed that over a third of feedback interventions decreased performance. This finding, which could not be explained by sampling error, feedback sign, or established theories, led to the proposal of the feedback intervention theory (FIT). The FIT offers an explanation as to how feedback is cognitively processed and how such processing influences one's response to feedback.

Kluger & DeNisi argue that behavior is regulated through comparisons of feedback to goals and standards, of which there are many. These goals and standards are organized by the individual hierarchically and, upon receiving feedback, individuals shift their locus of attention to varying levels of the hierarchy. The hierarchy progresses from task-learning processes (i.e. involving details of the task) to task-motivation (i.e. involving the focal task) and, finally, meta-task processes (i.e. involving the self). These three types of processes can impact feedback effectiveness in unique ways.

A core assumption of FIT is that feedback interventions command significant cognitive resources; yet, individual attention is limited. Feedback cues, the nature of the task, and situational and personality variables impact how one's limited attention is allocated to the hierarchical processes. When attention is directed toward the self, meta-

task processes are activated, and these processes attenuate the effects of feedback on performance. An example of such processes is the activation of affective responses. In contrast, attention directed to task-motivation processes can lead to increased effort and persistence. For instance, task-motivation processes can prompt the feedback recipient to compare the feedback to the task standard, which ultimately contributes to improved performance. However, in some cases, task-motivation processes are inadequate to eliminate the feedback-standard discrepancy. As a result, attention may shift to task-learning processes (e.g. increased cognitive elaboration of feedback). Task-learning processes help individuals develop working hypotheses and evaluations of their behaviors, as well as develop task-specific strategies.

Enhancing the effects of feedback on performance is important, particularly in the case of a performance discrepancy. Strategies for responding to such feedback are to: 1) increase effort, 2) abandon the standard, 3) change (i.e. lower) the standard, or 4) reject the feedback (Kluger & DeNisi, 1996). Through their arguments, Kluger and DeNisi (1996) highlight some of the challenges associated with corrective feedback. Corrective feedback, shown to lead to affective reactions (Ilgen et al., 1979), can divert attention up the hierarchy and further away from details of the task. This can hinder task-motivation processes, the link to task-learning processes. When task-learning processes are not activated, it can prevent one from identifying improvement strategies and may subsequently decrease the likelihood of reducing the feedback-standard discrepancy. Taken together, these findings suggest it may be less likely for recipients of corrective

feedback to increase effort and more likely for them to focus on affective reactions or to disregard the feedback. This is critical given that managers cannot avoid giving negative or constructive feedback to employees, and employees' responses to such feedback are pivotal for performance (Kinicki et al., 2004).

Krenn et al. (2013) lent partial support for the feedback intervention theory. Their study showed that individuals were more likely to raise the standard following positive feedback; however, there were no significant performance differences for those who raised standards following positive feedback and those who maintained standards. In contrast, corrective feedback was shown to lead to avoidance behaviors and no significant performance improvements, even when recipients chose to practice and maintain the standard. Again, this sheds light on the importance of identifying strategies that may assist individuals with tapping into the benefits of task-learning processes.

Ilgen et al.'s (1979) feedback process model. Ilgen et al. (1979) view the feedback recipient as a processor of information. Specifically, as individuals receive feedback, they process the information through a series of sequential cognitive steps that include: perception of feedback, acceptance of feedback, desire to respond, and intended response. Depending on the outcome of such processing, feedback may or may not lead to the desired behavior.

Perception of feedback refers to the extent to which the recipient perceives that feedback is an accurate representation of his or her behavior and, thus, influences the acceptance of feedback (Ilgen et al., 1979). These scholars argued that when individuals

receive timely, consistent, positive, and specific feedback from a credible and trustworthy source, they are likely to perceive the feedback as accurate and to accept the feedback.

Individual differences, such as locus of control and self-esteem, can also exert an influence on the perceptions of feedback and feedback acceptance.

Feedback acceptance prompts a desire to respond to the feedback. A recipient's desire to respond is believed to be influenced by the extent to which the feedback conveys a sense of competence and personal control to the recipient, as well as provides information about extrinsic rewards associated with the use of feedback. The desire to respond leads to behavioral intentions. Thus, Ilgen et al. (1979) argued that cognitive processes mediate the relationship between receipt of feedback and response to feedback.

As noted earlier, Kinicki et al. (2004) tested the Ilgen et al. feedback process model using covariance structure analysis. This was the first complete test of the proposition that individuals go through a series of cognitive evaluations prior to responding to feedback. Consistent with Ilgen et al.'s (1979) model, Kinicki et al. found strong support for the mediating properties of the cognitive chain. However, in their empirical test, a gestalt of feedback characteristics—frequency, specificity, and sign (positive)—was formed to develop a feedback-rich environment construct. In a feedback-rich environment, individuals receive frequent, specific, and positive feedback. Kinicki et al. (2004) demonstrated that when the feedback environment is rich, individuals are more likely to perceive the feedback as accurate. While this finding is important, it does not help to explain corrective feedback processing. To this point, there is a need for further

research that focuses on deep level cognitive processes that mediate the processing of feedback that conveys performance discrepancies.

From Kinicki et al.'s findings, it seems clear that cognitive processes play a critical role in how individuals respond to feedback. What remains less clear, however, is how to help employees overcome attitudinal and behavioral resistance to feedback that conveys performance discrepancy information (Kinicki et al., 2004). As discussed earlier, feedback is not always positive, as was represented in the feedback-rich environment construct, and past findings (Ilgen et al., 1979), as well as theory (e.g. self-consistency; self-enhancement), support the notion that individuals are less likely to perceive corrective feedback as accurate and therefore less likely to accept it. It is also not clear if specific feedback is the best option when providing corrective feedback. Given that feedback specificity may conflict with one's natural cognitive representation of the task (Kluger & DeNisi, 1996), is it plausible that specific feedback may obstruct some of the cognitive processes that mediate the relationship between the receipt of feedback and how one responds to feedback?

Scholars have argued that it is important for feedback to be processed at a deep level (Ingram, 1984), and this seems particularly true for processing feedback that highlights performance discrepancies and conveys the need for corrective actions. Thus, I argue that strategies that enhance deep-level information processing should be explored as a means to enhance the effectiveness of feedback. One process that can help achieve this is reflection.

Reflection

Reflection, a critical component of organizational learning and development (Argyris & Schön, 1974; Busby, 1999) has roots in ancient history (Daudelin, 1997) and has long been advocated (Dewey, 1933) as a way to enhance learning processes. Though several terms and definitions of reflection have been offered (see Table 1 for a sample), most emphasize deep level processes that help individuals analyze behaviors and gain awareness of their experiences. Such processes can enable learners to reframe their knowledge base (Raelin, 2007) and consequently may lead to new perspectives that influence behavior. Reflection has been a popular topic of inquiry in educational research (Fund, Court, & Kramarski, 2002; Kolb, 1983; Moon, 1999; Ryan & Ryan, 2013), as can be seen in influential learning theories, such as experiential learning theory (Kolb, 1983). Though, somewhat recently, management scholars have acknowledged its value in processing feedback and experiences, as well as leadership development (e.g. Anseel et al., 2009; Ellis et al., 2014). To better understand the value of reflection, this section reviews reflection studies in the management literature.

Table 1

Reflection Terminology & Definitions

Term	Source	Definition
Reflection	Anseel et al., 2009; Hullfish & Smith, 1961	A cognitive process in which a person attempts to increase his or her awareness of personal experiences and therefore his or her ability to learn from those experiences

Term	Source	Definition
Reflection	Boud et al., 1985	A generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciation
Reflective thought	Dewey, 1933	Active, persistent, and careful consideration, of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends
Systematic reflection	Ellis & Davidi, 2005	A learning procedure during which learners comprehensively analyze their behavior and evaluate the contribution of its components to performance outcomes
Reflection	Matthew & Sternberg, 2009	A process of guided critical thinking that directs attention selectively to various aspects of experience, making knowledge typically acquired without conscious awareness explicit and available for examination and modification
Reflection	Mezirow, 1990	The assessment of assumptions implicit in beliefs about how to solve problems
Reflection	Raelin, 2002	The practice of periodically stepping back to ponder the meaning of what has recently transpired to ourselves and to others in our immediate environment

Reflection Studies in Management Literature.

Over the last decade, there has been a stream of management research that has examined the role of reflection in learning from feedback and experiences. Ellis and colleagues (Ellis & Davidi, 2005; Ellis et al., 2006, 2009, 2010, 2014) have been at the forefront of this research, and their studies have demonstrated the value of systematically

reviewing experiences through after-event-reviews (AERs)—an organizational learning procedure that gives learners an opportunity to systematically analyze their behavior, as well as its contributions to performance outcomes. AERs provide learners with the opportunity to engage in a series of processes that are designed to contribute to learning and performance improvements. During the self-explanation process, learners analyze their behaviors and develop explanations for past performance; while, the data verification process engages counterfactual thinking, wherein learners consider alternate courses of action. Learners also benefit from feedback processes—during reflection, learners self-generate feedback that can contribute to learning. In contrast to definitions found in the feedback literature (e.g. Ilgen et al., 1979), Ellis & Davidi (2005) refer to feedback as “information with which a learner can confirm, overwrite, tune, or restructure information in memory, whether that information is domain knowledge, metacognitive knowledge, beliefs about self and task, or cognitive tactics and strategies” (p. 859). Thus, there are numerous potential outcomes of after-event-reviews.

After-event-reviews can influence motivational, cognitive, and behavioral outcomes. Specifically, AERs have been shown to increase self-efficacy, enhance mental models of events, and lead to improved task performance (Ellis et al, 2014). Through the Ellis et al. studies, we have learned that focusing on wrong actions is most effective when reflecting on successful events, any reflection foci (i.e. right or wrong actions) is effective when reflecting on failed events, and personal and filmed AERs are equally effective for performance improvement. Furthermore, AERs have been shown to be more effective

when learners make internal and specific, rather than external and general, attributions for their performance (Ellis et al., 2006).

In contrast to after-event-reviews operationalized as structured group reflections, Anseel et al. (2009) examined individual written reflections as a strategy to improve task performance following feedback. Their findings revealed that reflection following feedback enhanced performance more than feedback alone. Reflection without feedback did not yield significant performance improvements.

This research provides further support for the benefits of reflection, but is reflection effective for everyone? Anseel et al. (2009) found that individual differences influence the effectiveness of written reflections. Specifically, the strategy was less effective for those low in learning orientation and those low in need for cognition. When participants were low in these traits, they engaged less in reflection. Likewise, the strategy was less effective for those who reported that the task was not personally important to them.

Although, Anseel et al.'s study did not investigate whether individual written reflections are more effective for performance improvement than are group reflections, other studies have explored such. Daudelin (1996), as well as Gurtner, Tschan, Semmer, & Nägele (2007), found individual written reflections to be superior to group reflections. Group reflection discussions may distract individuals from focusing on helpful performance strategies, and the reflective thoughts may be less specific than those generated during written reflections (Daudelin, 1996). Thus, individual reflective

processes, which help individuals explore performance outcomes, may be particularly beneficial for enhancing the effectiveness of corrective feedback.

In sum, reflection studies in the management literature have offered support for the value of reflection as a learning intervention. However, important questions remain unanswered. Existing studies have not accounted for the unique contributions of specific forms of reflection to learning. For example, recall that reflection is believed to be facilitated through self-explanation, data verification (i.e. counterfactual thinking), and self-feedback processes. Are some of these processes more effective for certain types of feedback (e.g. corrective feedback)? We do not yet know, as studies have not disentangled these processes from each other (Ellis et al., 2014).

I argue that counterfactual thinking is an important form of reflection, especially for processing feedback on performance discrepancies, and should be examined independently from other forms of reflection. Counterfactual thinking is a common feature of human cognition (Sanna & Turley, 1996) that can be particularly active when individuals experience negative affect or identify problems (Epstude & Roese, 2008)—outcomes often associated with the receipt of corrective feedback (Ilgen et al., 1979). This leads one to ask—can the effectiveness of corrective feedback on subsequent performance be enhanced through counterfactual reflection and, if so, what are the boundary conditions that facilitate such reflection? My study builds on research in the psychology field which indicates that counterfactual thought serves a functional value, is a useful component of behavior regulation, and is closely connected to goal cognitions

(Epstude & Roese, 2008; Roese, 1997; Roese & Olson, 1997), all of which are important for responding to performance discrepancies. As such, the focus of this review now turns to counterfactual thinking.

Counterfactual Thinking

Counterfactuals have been defined as mental representations of alternatives to past events, actions, or states (Byrne, 2005; Roese, 1997). The earliest conceptualizations of counterfactual thinking were based in the simulation heuristic (Kahneman & Tversky, 1982) and presented in Kahneman & Miller's (1986) norm theory. These scholars proposed that individuals mentally undo events and simulate alternate versions of the events. Thus, counterfactual thinking can lead to learning from mistakes and to identifying alternate courses of action (Kahneman & Miller, 1986; Markman, Elizaga, Ratcliff, & McMullen, 2007; Roese, 1994).

Counterfactuals are depicted with conditional propositions that contain an antecedent and a consequence (Roese, 1997). There are multiple types of counterfactuals, as shown in Table 2. To better understand how counterfactual thoughts influence behavior, the following sections review empirical findings from the psychology literature, followed by a discussion of the functional theory of counterfactual thinking (Epstude & Roese, 2008), the framework that has organized the findings based on the paths through which behavior is regulated.

Table 2

Types of Counterfactual Thinking

Type	Description	Example
Counterfactual Direction Upward vs. downward	Comparison of a present outcome to a better (upward) or worse (downward) outcome	“I should have taken the job with the higher salary.” (upward) “Other people with my qualifications earn much less than I do.” (downward)
Counterfactual Structure Additive vs. subtractive Inaction vs. action	Addition or subtraction of an aspect from the present state	“I should never have started smoking.” (subtractive; focus: action) “I should have taken vitamin C.” (additive; focus: inaction)
Counterfactual Referent Self vs. others	Focus is on the actions or features of oneself or other people	“I should have driven more slowly.” (self) “The other driver should have paid more attention.” (others)

Adapted from Epstude & Roese, 2008

Counterfactual Direction.

Early research on counterfactual thinking attributed counterfactual direction (i.e. direction of comparison) strictly to emotional regulation (Taylor & Schneider, 1989). Researchers have since acknowledged that counterfactual direction can serve both affective and preparative functions (e.g. Epstude & Roese, 2008; Markman, Gavanski, Sherman, & McMullen, 1993; Sanna, 2000). Upward counterfactual thoughts improve reality (e.g. “if only...”), whereas downward counterfactuals worsen reality (e.g. “at least...”) (Markman et al., 1993). Thus, upward counterfactuals can prompt one to consider paths for self-improvement, while downward counterfactuals can regulate mood

repair and maintenance. To date, scholars have reported numerous antecedents and outcomes of counterfactual direction.

Markman et al.'s (1993) research was the first to identify the functional value of counterfactual thinking and to investigate factors that may lead one to engage in such thinking. Prior research had largely focused on cognitive rules that prompt counterfactual generation, such as the timing of events in the cognitive chain (Kahneman & Miller, 1986; Wells, Taylor, & Turtle, 1987). In contrast, Markman et al. argued that counterfactual thoughts can be driven by situational factors, and in any given situation, individuals will generate the counterfactuals that yield the most psychological value. Using a computer-simulated blackjack game, they examined the effects of event repeatability on participants' spontaneous counterfactual generation—both the prevalence and the direction. The results demonstrated that when individuals believed the event was repeatable (i.e. had the opportunity to play again), they engaged more in counterfactual thinking, and they made upward comparisons—thoughts about how their results may be better. This empirical test lent support to their notion that upward comparisons were activated by the goal of future improvement. In contrast, downward counterfactuals were used as a coping mechanism for those who had performed poorly and believed they would not have an opportunity for improvement. In fact, when individuals generate upward comparisons in the absence of opportunity for future improvement, it can often lead to negative affective consequences (Sanna, 1997).

Overall, individuals are more likely to engage in upward comparisons after they have experienced a loss or failure, which in a work-context could be when encountering performance discrepancies. Downward comparisons, on the other hand, are more common following successes (Markman et al., 1993; Roese & Olson, 1995; Sanna & Turley, 1996). Though, this is not always the case—the influence of outcome valence on counterfactual direction may be different based on one's perceptions of control. Perceived control influences counterfactual generation (Markman et al., 1995; Roese & Olson, 1995), such that individuals tend to alter aspects of events that are within their control and the outcomes they deem controllable. If individuals feel as though they cannot control the outcome, they will be less likely to generate upward counterfactuals, even if they have experienced a loss or failure. When the outcome is perceived to be uncontrollable, greater functional value (e.g. preserve or enhance self-esteem) can be gained from downward comparisons (Roese & Olson, 1995). Because upward counterfactuals focus on performance improvement, it is important to better understand antecedents of upward counterfactual thinking. What factors, beyond perceived control, outcome valence, and beliefs about future opportunities, influence upward counterfactual thinking?

Morris & Moore (2000) were among the first scholars to consider the influence of organizational factors on counterfactual thoughts. In doing so, they investigated how accountability may influence counterfactual thinking. Specifically, they examined the influence of hierarchical accountability on the generation of self-focused upward

counterfactuals—the counterfactuals that have been shown to be particularly beneficial for learning (Epstude & Roese, 2008).

Using archival data from the Aviation Safety Reporting System, which included pilots' reflections on naturally occurring near accidents, Morris & Moore (2000) examined the prevalence of self-focused upward counterfactuals, specific comments about lessons learned, and how such lessons will be applied in the future. While all pilots are required to complete a reflection following a near accident, the researchers argued that commercial and military pilots, compared to private pilots, would be reflecting under higher levels of accountability and thus may reflect differently. The findings, which were later replicated in a lab study, revealed that higher accountability inhibited self-focused upward counterfactuals, as well as learning processes. Similar effects were seen in Markman & Tetlock's (2000) lab study, wherein accountability led to counterfactual excuse-making (i.e. denying responsibility through "I couldn't have known...").

Upward counterfactual thinking may lead individuals to accept responsibility for undesirable outcomes, which can come at the expense of regret, negative affect and dissatisfaction with performance outcomes, especially for those with low self-efficacy (Markman, Gavanski, Sherman, & McMullen, 1995; Markman et al., 1993; Pierro et al., 2008; Sanna, 1997). However, research suggests that overall the benefits of upward thinking outweigh the costs. Upward counterfactual thinking can trigger hopefulness about the future (Boninger, Gleicher, & Strathman, 1994), develop a sense of perceived control (Nasco & Marsh, 1999), lead to motivation and preparative intentions for future

behaviors (McMullen & Markman, 2000; Roese, 1994; Sanna, 1997), and improve task persistence (Markman, McMullen, & Elizaga, 2008; Markman, McMullen, Elizaga, & Mizoguchi, 2006).

Notably, individual differences and beliefs can influence the effects of counterfactual thinking. Research has shown that individuals with low self-efficacy felt less prepared when generating upward counterfactuals, whereas those with high self-efficacy felt prepared following both upward and downward counterfactual thinking, as long as they believed the event was repeatable (Sanna, 1997). Dyczewski & Markman (2012) also found evidence that beliefs about ability can influence counterfactual thinking outcomes. In their study, participants who believed intelligence-related abilities were fixed (i.e. entity theorists) displayed greater motivation and enhanced performance when they reflected on downward counterfactuals. In contrast, those who believed intelligence-related abilities are malleable (i.e. incremental theorists) were more motivated and performed better following upward counterfactual thinking.

Taken together, the research on counterfactual direction has shown that perceptions of control, ability-related beliefs, and organizational factors can influence counterfactual direction. Moreover, perceptions about future opportunities for improvement affects whether one reflects upward or downward. For this reason, opportunity has been called the “master moderator” (Eptsude & Roese, 2008). When an opportunity is present, individuals tend to respond with behavioral regulation; whereas a lack of opportunity or problematic circumstances leads to affect regulation.

Counterfactual Structure.

Counterfactuals are constructed by adding or removing elements that were in the original event (Roese & Olson, 1993). When individuals focus on their inactions, the counterfactuals take an additive structure (e.g. “If only *I had* taken advantage of the extra training available...”). In contrast, when individuals focus on their actions, they engage in subtractive counterfactual thinking (e.g. “If only *I hadn't* missed the policy update...”). Empirical findings indicate counterfactual structure may play an important role in how people process information and form behavioral intentions (Epstude & Roese, 2008).

Individuals are more likely to generate additive counterfactuals following negative (Roese & Olson, 1993) and unexpected events (Sanna & Turley, 1996). Because these counterfactuals help to illuminate alternate strategies and to identify ways to avoid undesirable outcomes, they can constitute an adaptive strategy that enhances future performance (Roese, 1994; Roese & Olson, 1993). Kray, Galinsky, & Markman (2009) demonstrated this during a negotiation task. Participants engaged in counterfactual thinking between negotiation rounds, and those who reflected via additive counterfactual thinking, rather than subtractive, were more successful at obtaining value and generating creative agreements during the negotiations.

Kray et al.'s (2009) findings are consistent with research by Markman et al. (2007). Kray et al. revealed that two very different information processing styles are evoked by additive versus subtractive thinking. Their research demonstrated that additive thinking promotes an expansive processing style, wherein individuals tend to be more

creative. In such cases, individuals are free to explore multiple ways of altering an event (Kray et al., 2006). In contrast, subtractive thinking counterfactuals center on existing knowledge structures (i.e. elements in the original event), which prompt a relational processing style that tends to be more effective for performance on analytical tasks. Since Markman et al.'s (2007) study, it has been proposed that subtractive thinking requires more controlled mental operations and may have a lower likelihood for eliciting behavioral intentions, though further investigation of additive and subtractive counterfactuals has been encouraged (Epstude & Roese, 2008).

Counterfactual Referent.

A final, yet important, distinction between various types of counterfactuals is that of self-focused versus situation- or other-focused. Recall that Morris & Moore (2000) found that accountability can inhibit self-focused counterfactuals, which may lead one to focus on others' actions or various circumstances beyond one's control. Similarly, lack of personal control and lack of power have also been shown to diminish self-focused counterfactual thinking (Scholl & Sassenberg, 2014). When individuals lack such, they may be more prone to focus on others' actions, which tends to lead individuals to think counterfactually about how others could have made the outcome better (Rim & Summerville, 2014). While individuals can learn from other-focused counterfactuals, self-focused counterfactuals are more useful for personal improvement and are believed to provide greater functional value (Epstude & Roese, 2008). Based on this and what we

know about counterfactual direction, it may be more likely for those who receive corrective feedback to learn and to attain performance improvements when they engage in self-focused upward counterfactual thinking. If this is true, then it is important to investigate factors that may prompt individuals, who encounter performance discrepancies, to generate self-focused upward counterfactuals.

In sum, counterfactual thinking is a component of everyday thoughts. Individuals think counterfactually by comparing reality to alternate versions of outcomes and actions. Through such thoughts, individuals experience affective and preparative consequences. Following decades of research in the psychology field, scholars now contend that the primary function of counterfactual thinking centers on the management of ongoing behavior. To explicate the various ways in which counterfactual thinking influences behavior, Epstude & Roese (2008) proposed the functional theory of counterfactual thinking which organizes the aforementioned findings and counterfactual effects on behavior along two paths. The following section provides a discussion of this theory.

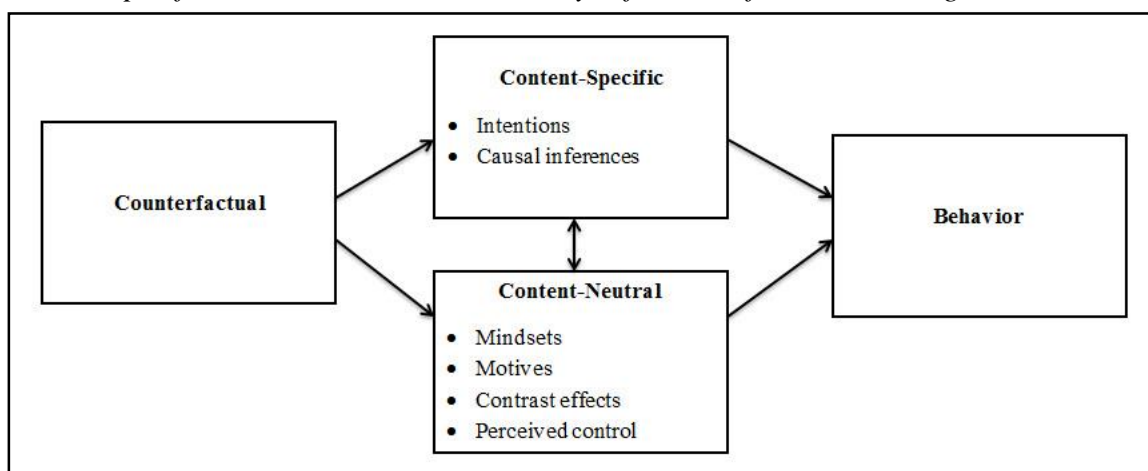
The Functional Theory of Counterfactual Thinking.

The functional theory of counterfactual thinking is grounded in processes of comparative judgment and the fundamental assumption that counterfactual thought regulates behavior (Epstude & Roese, 2008). Based on this theory, counterfactual thinking is activated through the recognition of a problem (e.g. performance discrepancy) or negative affect, such as that triggered by a negative emotional reaction. Counterfactual

thinking affects intentions and behaviors. This can be facilitated by two pathways, the content-specific pathway and the content-neutral pathway, which are illustrated in Figure 1 and discussed thereafter.

Figure 1

Content-Specific vs. Content-Neutral Pathways of Counterfactual Thinking



Adapted from Epstude & Roese, 2008

Content-specific pathway. The content-specific pathway illuminates causal inferences—lessons learned or beliefs in the causal effectiveness of behaviors—that serve as a foundation for behavioral intentions (Epstude & Roese, 2008). Counterfactual thinking is prompted by negative affect, events, or experiences that leave individuals unsatisfied with outcomes or their performance levels. Because counterfactuals take a conditional form that specifies antecedents and consequences, one can make causal inferences that link actions to outcomes. Thus, individuals can gain insights that are useful for behavior—benefits that are akin to those of task-learning processes in Kluger & DeNisi's (1996) feedback intervention theory. Causal inferences are more beneficial

when generated through upward counterfactual thinking, as its focus is improvement rather than maintaining status quo (i.e. downward counterfactuals) (Epstude & Roese, 2008).

According to the functional theory of counterfactual thinking, counterfactuals may influence behavior indirectly by developing intentions which, in turn, impact behavior, or directly—through task-specific insight. When stronger links between behaviors and events are developed in memory, individuals are more likely to form intentions for future opportunities (Sheeran, Webb, & Gollwitzer, 2005). Counterfactuals help to create the link in memory and to facilitate such intentions. The manifestation of intentions to behaviors is further supported through other theoretical frameworks (e.g. theory of planned behavior) (Ajzen, 1991; Ajzen & Fishbein, 1980).

Multiple counterfactual studies have demonstrated the direct effect of counterfactuals on behavior (e.g. Roese, 1994; Markman et al., 2008). Specifically, studies have prompted subjects to generate counterfactuals about their anagram performances, and then provided them with opportunities to perform again. Across these studies, individuals' persistence and performance levels increased more following upward, additive, and self-focused counterfactual thinking. These studies have also demonstrated the impact of counterfactuals on mood and strategic thoughts (Epstude & Roese, 2008), which leads to the second pathway of counterfactual thinking—the content-neutral path.

Content-neutral pathway. In contrast to the content-specific pathway, that transfers specific information from causal inferences, the content-neutral pathway influences behavior through shifts in mindsets, motivation, and self-inferences. Epstude & Roese (2008) argue that the content-neutral pathway is less about specific information and more about how information is handled, and they go on to state that a counterfactual can “ignite attentional, cognitive, or motivational processes that themselves alter behavior” (p. 175). For example, recall that Kray et al. (2006) found that additive counterfactuals led to more creative negotiation tactics, thus demonstrating a different mind-set prompted by additive vs. subtractive thinking. The motivational effects can be seen in studies that indicate additive counterfactuals activate a promotion focus, whereas subtractive counterfactuals activate a prevention focus (Roese et al., 2009; Roese et al., 2006). Finally, counterfactual thinking can result in self-inferences—such as one’s sense of mastery or confidence—and feelings of personal control, such as those demonstrated in McMullen et al. (1995) and Nasco & Marsh (1999). Together, these influences affect behavior.

An assumption of the functional theory of counterfactual thinking is that the compatibility between the two paths should strengthen effects on behavior (Epstude & Roese, 2008). For example, if an individual experiences increased motivation from counterfactual thinking, the effects of content-specific paths (e.g. causal inferences) should be clearer and stronger. It is further proposed that causal links in one task domain

may be facilitated from mind-sets produced by counterfactuals in a different domain. Thus, benefits of counterfactual thinking may transfer across situations.

Counterfactual thinking is prompted by negative experiences, is a ubiquitous aspect of cognition, and has been shown to influence behavior in numerous ways. Thus, the functional theory of counterfactual thinking offers a valuable perspective when assessing how employees may process and respond to corrective feedback on performance discrepancies. Yet, to date, there are few studies (e.g. Morris & Moore, 2000) that have investigated the impact of workplace factors on counterfactual thinking, which are crucial to consider when examining how employees' process and respond to performance discrepancies. To this point, in the following section I propose and develop hypotheses for factors that influence counterfactual thinking during feedback processing and subsequent performance.

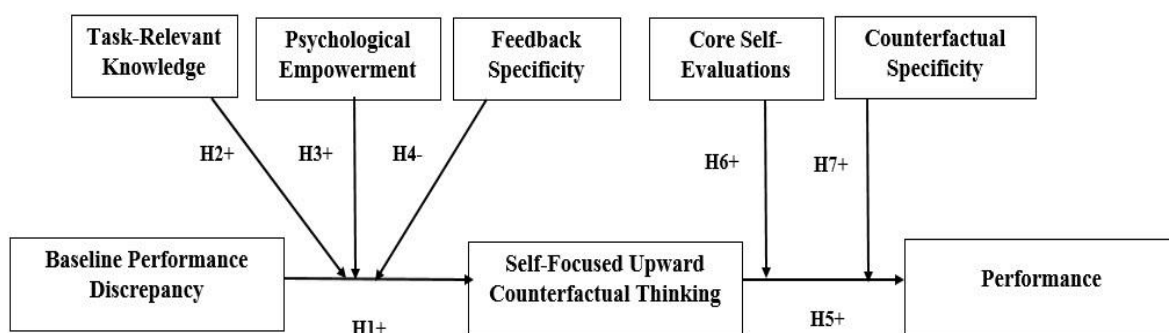
Hypotheses Development

The feedback process can be impacted by individual differences, as well as situational and contextual factors. Thus, it was important to consider such factors when examining the role of counterfactuals in the cognitive processing of corrective feedback, as well as subsequent learning and behavioral changes. Recall that, compared to other types of counterfactuals, self-focused upward counterfactuals are particularly useful for learning and behavioral regulation (Epstude & Roese, 2008). However, little is known about individual and contextual factors that prompt individuals to develop these types of

counterfactuals. For this reason, in the current research, I explore boundary conditions that prompt or inhibit self-focused upward counterfactual thinking following performance discrepancies. Likewise, the conceptual model includes proposed boundary conditions that influence the effect of self-focused upward counterfactual thinking on performance. Examining these relationships should help explain the relationship between baseline performance discrepancies (conveyed through corrective feedback) and changes in individuals' performance. Figure 2 illustrates the hypothesized relationships.

Figure 2

Hypothesized Relationships



I propose that task-relevant knowledge and psychological empowerment will accentuate self-focused upward counterfactual thinking while feedback specificity will attenuate such thinking. Task-relevant knowledge refers to facts and knowledge structures that are necessary for successful task performance (Costanza, Fleishman, & Marshall-Mies, 1999). Psychological empowerment refers to a set of psychological states—meaning, competence, self-determination, and impact—that are necessary for individuals to feel a sense of control in relation to their work (Spreitzer, 2008). As

previously reviewed, feedback specificity is a situational variable that has been defined as the level of information presented in the feedback message (Goodman et al., 2004).

I also propose that performance following counterfactual thinking, will be influenced by core self-evaluations, as well as counterfactual content. The concept of core self-evaluations is a higher-order trait that encompasses basic conclusions individuals hold about themselves, the world, and others (Judge et al., 2007; Judge et al., 2003; Bono & Judge, 2003). In the current research, counterfactual specificity refers to the level of detail versus abstraction of counterfactual thoughts.

Effect of Baseline Performance Discrepancy on Self-Focused Upward Counterfactual Thinking.

Consistent with my review of the counterfactual thinking literature, I propose that feedback that conveys a performance discrepancy, compared to other types of feedback, will predict self-focused upward counterfactual thinking. Recall that self-focused upward counterfactuals focus on how an individual could have altered his or her behavior to achieve a better outcome. According to the functional theory of counterfactual thinking (Epsude & Roese, 2008), the first step in the regulatory process of counterfactual thinking is the identification of a problem (e.g. performance discrepancy) or the experience of negative affect. In such situations, individuals often attempt to reconcile discrepancies and to learn from their mistakes; self-focused upward counterfactual thinking can help achieve these ends (Roese, 1994).

Relative to other types of feedback (e.g. positive feedback), feedback that conveys a discrepancy is more likely to prompt self-focused upward counterfactual thinking. Research on negativity bias is one literature stream that provides insight on how performance discrepancies may prompt such thinking. Negativity bias refers to the tendency for individuals to pay more attention to negative than to positive information (Cacioppo & Berntson, 1994; Ito, Larson, Smith, & Cacioppo, 1998). Across numerous domains (for a review see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), scholars have found that negative information impacts behaviors and cognitions more strongly than comparable positive information. In other words, negative information is more potent than positive information and, as a result, people react more strongly (Baumeister et al., 2001).

The elevated potency inherent in corrective feedback, compared to other feedback, increases the likelihood that feedback recipients will engage in self-focused upward counterfactual thinking. Böhner, Bless, Schwarz, & Strack (1988) demonstrated that individuals are more likely to engage in causal and analytic reasoning following negative events, compared to positive events, as such thinking may help individuals to avoid similar situations in the future. Similarly, Baumeister (1991) found that when individuals experience a negative situation, they are more likely to search for meaning and to try to make sense of the situation compared to positive situations. In this way, negative information leads to more extensive and elaborate information processing than positive information (Baumeister et al., 2001).

The influence of negativity is not limited to past events; it also affects individuals' thoughts about the future. Individuals are often motivated to avoid future negative outcomes (Kahneman & Tversky, 1979). Upon receiving feedback on performance discrepancies and in an effort to avoid negative outcomes, individuals may reflect on past behaviors and consider alternative future behaviors that will decrease the likelihood of further negative outcomes. In essence, the negative potency of such feedback should prompt one to engage in analytic reasoning about their behaviors (Bohner et al., 1988) and to try to avoid future mistakes. Thus, it is likely such reasoning will be facilitated by self-focused upward counterfactuals.

Studies have demonstrated that self-focused counterfactuals are more prevalent than other-focused counterfactuals (Davis et al., 1995; White & Roese, 2007), while upward counterfactuals have been shown to be more common than downward (Epstude & Roese, Nasco & Marsh, 1999; Roese & Olson, 1997). Additionally, upward counterfactual thinking is the most common type of counterfactual thinking following failure (Markman et al., 1993) and self-focused is best suited for learning and behavioral regulation (Epstude & Roese, 2008). Following these findings and based on the preceding discussion, I predict:

Hypothesis 1: Baseline performance discrepancy will positively relate to self-focused upward counterfactual thinking.

Hypothesis 1 is consistent with previous findings. Though, recall that one of the primary objectives of the current research is to explore boundary conditions that

determine when individuals, who receive feedback on performance discrepancies, will engage in self-focused upward counterfactual thinking. We know that contextual factors, such as accountability (Morris & Moore, 2000), can inhibit self-focused upward counterfactual thinking. What other factors may inhibit or promote self-focused counterfactuals? To address this question, the following section presents proposed moderators of the relationship between baseline performance discrepancy and self-focused upward counterfactual thinking.

Moderators of the Effect of Baseline Performance Discrepancy on Self-Focused Upward Counterfactual Thinking.

Task-relevant knowledge. Knowledge is defined as “a collection of discrete but related facts and information about a particular domain,” and task-relevant knowledge refers to facts and knowledge structures that are necessary for successful task performance (Costanza et al., 1999, p. 71). According to Locke (2000), task-relevant knowledge influences how individuals approach tasks and the specific actions individuals implement to make their task strategies work. I propose that, following performance discrepancies, higher levels of task-relevant knowledge will increase self-focused upward counterfactual thinking.

Theoretically, this argument is consistent with Bandura’s (Bandura, 1977, 1986) social cognitive theory. According to social cognitive theory, task knowledge can enable individuals to transform experiences into guides for task behaviors (Bandura, 1986). Bandura argued that knowledge serves as a resource, from which individuals can

generate innovative courses of action. When individuals possess task-relevant knowledge, they are more likely to experience higher levels of self-efficacy (Bandura, 1986), a trait shown to increase the preparative function of upward counterfactual thinking (Sanna, 1997).

Similarly, task-relevant knowledge can enhance one's ability to exercise self-influence in his or her work environment (Bandura, 1986), thereby increasing the number of behavioral options available. Barrick & Spilker (2003) demonstrated that when individuals possess higher levels of task knowledge, they are more likely to focus on relevant information for attaining goals and are more likely to engage in goal directed behaviors. Task-relevant knowledge has also been shown to positively influence the number and quality of solutions generated when solving workplace problems (Butler & Scherer, 1997).

From this research, it is evident that task-relevant knowledge helps individuals to direct efforts towards goals, as well as to select a behavioral response from among multiple possibilities (Bandura, 1986). Recall that as individuals' perceptions of opportunities increases, so too does the likelihood of upward counterfactual thinking (e.g. Eptsude & Roese, 2008; Markman et al., 1993). Thus, it follows that an increased capability to engage in self-influence and an increased repertoire of behavioral opportunities for attaining a task goal will lead one to engage in self-focused upward counterfactual thinking. In contrast, a deficiency in task knowledge restricts one's choice of task behaviors, thereby limiting the exercise of self-influence, and inhibits

opportunities (Bandura, 1986). When opportunities are lacking, individuals are more likely to engage in downward counterfactual thinking (Markman et al., 1993).

Other research also supports the argument that following performance discrepancies, higher levels of task-relevant knowledge will increase self-focused upward counterfactual thinking. More precisely, task-relevant knowledge facilitates better representations of problems encountered during a task (Braune & Foshay, 1983), provides additional information to draw upon when solving problems (Phillips & Gully, 1997), and helps individuals transition from one problem state to another (Jong & Ferguson-Hessler, 1996).

Prior knowledge influences new conceptualizations of events. As individuals develop new conceptualizations, they have a tendency to “hark back to old ideas,” from which they can draw insight and use to reassemble in a new conceptualization (Perkins, 1988). In the context of a work domain, old ideas include prior task knowledge. Research has demonstrated that even when individuals are instructed to not use such knowledge during a task, inadvertently, they do (Marsh, Ward, & Landau, 1999).

Scholars have established that higher levels of task-relevant knowledge can lead to more effective work behaviors. To this point, Rapp, Ahearne, Mathieu, & Schillewaert (2006) found that salespeople with higher levels of task knowledge were more likely to engage in adaptive selling. In doing so, they experimented with new techniques, adjusted to meet the demands of a situation, and engaged in other similar success-facilitating strategies.

Because task-relevant knowledge contributes to one's ability to exercise self-influence in his or her work environment, and task-relevant knowledge has been shown to provide additional insights about problems and events, facilitates better representations of situations, leads to adaptive behaviors, and is positively related to self-efficacy, I argue that such knowledge will influence the extent to which individuals explore mental simulations of how they could have altered their behaviors to attain better work outcomes. Therefore, I predict:

Hypothesis 2: Task-relevant knowledge moderates the influence of baseline performance discrepancy on self-focused upward counterfactual thinking, such that the influence becomes more positive as task-relevant knowledge increases.

Psychological empowerment. Psychological empowerment is a motivational construct that emerged from the empowerment literature (Conger & Kanungo, 1988; Spreitzer, Kizilos, & Nason, 1997; Thomas & Velthouse, 1990). In contrast to social-structural forms of empowerment, which emphasize the sharing of power between subordinates and supervisors through organizational interventions (Conger & Kanungo, 1988), psychological empowerment captures the extent to which employees *experience* empowerment (Spreitzer, 2008). In this way, psychological empowerment is a cognitive state, which is manifest in four dimensions.

According to Spreitzer and colleagues (Spreitzer, 1995; Spreitzer et al., 1997), individuals perceive that they are empowered and in control of their work when they experience meaning, competence, self-determination, and impact. Meaning reflects the

extent to which individuals psychologically invest in a task (Thomas & Velthouse, 1990) and refers to the alignment of one's work goals and beliefs or values (Maynard, Gilson, & Mathieu, 2012; Spreitzer, 1995). Competence, which has been linked to the concept of self-efficacy (Bandura & Cervone, 1983), reflects an individual's belief in his or her capability to perform work activities (Spreitzer, 1997). Individuals experience self-determination when they have choice in initiating and regulating their action and when they experience a sense of autonomy (Deci et al., 1989). The fourth dimension, impact, represents the extent to which individuals believe their behavior will influence work outcomes (Spreitzer, 2008). Scholars have demonstrated that when one of the four dimensions is missing, the experience of empowerment will be limited (Spreitzer, 1995).

Across numerous studies, scholars have consistently shown that empowerment predicts performance and other positive workplace outcomes (Seibert, Wang, & Courtright, 2011). Though, to date, the influence of empowerment on learning through counterfactual thinking has not yet been examined. However, prior research on social power, the capacity to control one's own and others' outcomes (Fiske & Berdahl, 2007), and social perception support the prediction that psychological empowerment will positively contribute to self-focused upward counterfactual thinking.

Power affects basic cognition and has clear links to self-regulation (Guinote, 2007b). Across three studies, Galinsky, Gruenfeld, & Magee (2003) demonstrated that, compared to those with low power, those with high power are more likely to act in a goal-consistent manner and to show a strong tendency toward action versus inaction.

Likewise, research has shown that, during goal-pursuit, those with power are more likely to attend to goal relevant cues, are better at prioritization, are more flexible in their thinking, and extensively process central information about a task or situation (Guinote, 2007). Similarly, studies have shown that power increases task persistence and resistance to external influences that detract from goal attainment (Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Slabu & Guinote, 2010). From this research, it can be seen that power is positively related to thoughts and behaviors that support goal attainment.

In contrast, powerless individuals face challenges during goal pursuit and operate under more constraints. They have to attend to multiple cues in the environment, many of which may not be relevant for task success (Guinote, 2007a; Keltner, Gruenfeld, & Anderson, 2003). A lack of power also tends to inhibit behaviors during goal-pursuit (Galinsky et al., 2003). To this point, the approach-inhibition theory of power (Keltner et al., 2003) indicates that power directs one's actions towards reducing discrepancies between current and desired end states, while a lack of power leads one to focus on avoiding threats and punishments. Thus, the powerless experience less flexible thinking and a stronger focus on obstacles and barriers in the environment (Galinsky et al., 2008). With increased attention to multiple cues and goals in a situation (e.g. avoiding punishments while executing a task), the powerless may have less cognitive resources to devote to goal-pursuit (Shah, Friedman, & Kruglanski, 2002).

Scholars have recently examined the role of social power in counterfactual thinking. Through a series of studies, Scholl & Sassenberg (2014) demonstrated that

when individuals had less power (i.e. subordinate vs. manager) they were less likely to engage in self-focused counterfactuals. In contrast, those with high power were more likely to engage in such thinking. The effect of high power on self-focused counterfactuals was independent of attributions and facilitated by a perceived sense of personal control. When individuals experienced a sense of personal control, they considered alternative ways in which they could have changed the outcome. In contrast, those with less power and, consequently, a lower sense of personal control were more likely to succumb to thoughts about how the situation may have been different or how others could have behaved differently (i.e. other-referent counterfactuals).

In the context of a workplace, one's sense of power is not determined solely by his or her role or job position. Rather, individuals can acquire a sense of power when they perceive to be in control of their work, that is, through psychological empowerment (Conger & Kanungo, 1988). In such instances, individuals adopt an active orientation toward their work and sustain increased levels of task motivation (Spreitzer, 1995). Psychological empowerment should thus have important implications for how individuals process feedback on performance discrepancies. To this point, and based on the findings reviewed above, when individuals are confronted with performance discrepancies, psychological empowerment will positively contribute to self-focused upward counterfactuals—the counterfactuals that lead to learning and illuminate strategies for performance improvement.

Hypothesis 3: Psychological empowerment moderates the influence of baseline performance discrepancy on self-focused upward counterfactual thinking, such that the influence becomes more positive as psychological empowerment increases.

Feedback specificity. Recall that the level of information presented in a feedback message can vary in specificity. Specific feedback highlights errors individuals have made and provides detailed information on how recipients can improve their performance (Goodman et al., 2004; Payne & Hauty, 1955). When individuals receive specific feedback, they are more likely to judge the correctness, accuracy, and adequacy of their response (Bourne, 1966). Yet in many ways, specific feedback reduces the need for recipients to engage cognitive processes, as they are essentially given a roadmap to guide performance improvement efforts. In contrast, low feedback specificity provides substantially less information and can highlight a problem that is not well understood. Individuals may attempt to overcome such a problem by engaging in self-focused upward counterfactual thinking. Prior research and theory in the feedback literature (Goodman et al., 2004, 2011), as well as other bodies of learning literature (Keith & Frese, 2008), support this logic.

Error management training (Frese, 1995) is one stream of research that offers insight on varying levels of guidance during learning, and the value of error management training is supported by action theory (Frese & Zapf, 1994). According to action theory, individuals hold action-oriented mental models that are foundational to work behaviors.

Errors contribute to the development of such models, as errors contain information that help individuals to think retrospectively about their strategies and to adjust strategies to improve performance (Keith & Frese, 2008).

Error management training consists of learning events, wherein learners are provided *minimal* guidance. In such training, individuals are afforded opportunities to make errors, to identify the cause of the errors, and to generate solutions to overcome the errors (Ivancic & Hesketh, 2000). Learners are not guided by immediate specific feedback. Rather, they are enabled to engage in deep level information processing, which is believed to be one of the mechanisms that contributes to the effectiveness of error management training (Dormann & Frese, 1994). Indeed, there are benefits to this training approach. Error management training increases controlled processing of behaviors (Ivancic & Hesketh, 2000) and facilitates self-regulatory processes, such as metacognitive activity and emotional control in the face of performance discrepancies (Keith & Frese, 2005). It is also an effective approach for promoting adaptive task strategies (Ivanhic & Heketh, 2000), as well as increasing transfer of training (Keith & Frese, 2008).

A variation of error management training, guided error training, differs from the above approach in that learners are provided examples of errors, along with the solutions for overcoming the errors. In this way, guided error training provides more details (i.e. higher specificity) to learners. Ivanhic & Heketh (2000) demonstrated that guided error training decreases opportunities to build metacognitive skills and inhibits adaptive

transfer—the use of knowledge to change a learned procedure or to generate a solution to a new problem. Additionally, they suggested that, during guided error training, learners may be more likely to attribute their errors to the training program rather than to themselves. The drawbacks of the guided approach help to highlight the potential value of less specific feedback to self-focused upward counterfactual thinking. Attributions facilitate counterfactual thinking (N'gbala & Branscombe, 2003). In the case of guided error training, higher specificity may inhibit the self-focused attributions that facilitate self-focused counterfactuals, as well as the metacognitive activity that supports planning, monitoring, and evaluation of one's task progress (Brown, Bransford, Ferrara, & Campione, 1983). It is plausible to consider such effects will be present when examining the influence of high feedback specificity on counterfactual thinking.

Empirical findings in the feedback literature, also support the argument that less specific feedback will enhance self-focused upward counterfactual thinking. Goodman et al. (2011) reported that less specific feedback led to increased levels of explicit information processing, as measured in a “think out loud” decision-making experiment. Those in the low feedback specificity condition also engaged in more planning for the future. When individuals are focused on preparing for the future and finding routes to alleviate problems, they often engage in upward counterfactual thinking (Sanna, 2000). Such counterfactuals can help to illuminate causal links between behaviors and outcomes that may otherwise not be apparent.

In an earlier experiment, Goodman et al. (2004) examined the effects of feedback specificity on practice performance, exploration, and learning during a series of decision-making tasks. The results of the study revealed that high feedback specificity was negatively related to exploratory behavior and learning. In the context of counterfactual thinking, high feedback specificity may limit the extent to which individuals explore alternative versions of their behaviors and associated performance outcomes.

Based on the preceding discussions, I hypothesize that:

Hypothesis 4: Feedback specificity moderates the influence of baseline performance discrepancy on self-focused upward counterfactual thinking, such that the influence becomes weaker as feedback specificity increases.

The Effect of Self-Focused Upward Counterfactual Thinking on Performance.

Counterfactual thinking involves the transfer of information from a causal inference and/or the activation of information processing that enhances motivation and effort expenditure. These processes, attained via the content-specific and content-neutral pathways, fuel behavior change (Epstude & Roese, 2008). Self-focused upward counterfactuals are particularly influential for behavioral regulation and, in this study, are expected to predict performance.

As previously reviewed, multiple studies have shown that upward counterfactuals predict intentions for behavior change. More precisely, upward counterfactuals lead to intentions to perform success-facilitating behaviors (Roese, 1994). Beyond intentions to

perform improved behaviors, there is also robust support for the influence of upward counterfactuals on improving performance, specifically on anagram tasks and academic outcomes (e.g. Markman et al., 1993; Nasco & Marsh, 1999; Roese, 1994). Given that upward counterfactuals predict behavioral intentions and performance improvement in such situations, it follows that, in a work context, upward counterfactuals will also predict performance. Likewise, and as noted by Epstude & Roese (2008), “it is straightforward that self-focused thoughts are more useful for self-improvement” and behavior change (p.179).

Therefore, I predict:

Hypothesis 5a: Self-focused upward counterfactual thinking is positively related to performance.

Scholarly research has indicated that performance discrepancies can prompt self-focused upward counterfactual thinking, and such thinking influences behavior (Epstude & Roese, 2008). These findings suggest that self-focused upward counterfactual thinking will mediate the relationship between baseline performance discrepancy and performance. To this point, feedback on performance discrepancies should prompt individuals to reflect on alternative strategies they could have pursued to attain a better outcome. Such reflection provides causal insight about behaviors and outcomes, as well as motivational benefits (Epstude & Roese, 2008), which, in turn, affects performance.

Specifically, I hypothesize:

Hypothesis 5b: Baseline performance discrepancy indirectly affects performance, through self-focused upward counterfactual thinking.

In accordance with my previously stated objectives, this research also explores the conditions that lead one to improve performance following self-focused upward counterfactual thinking. Therefore, the following section outlines proposed boundary conditions that influence the extent to which such thinking effects performance.

Moderators of the Effect of Self-Focused Upward Counterfactual Thinking on Performance.

Core self-evaluations. Core self-evaluations are fundamental, bottom-line evaluations that individuals hold about themselves, others, and the world (Judge, Locke, & Durham, 1997). These evaluations consist of four traits, including self-esteem, generalized self-efficacy, locus of control, and neuroticism (see Table 3), which, together, form a higher-order core self-evaluations trait. Core self-evaluations have been shown to predict life and job satisfaction, as well as job performance (Bono & Judge, 2003; Judge, Locke, Durham, & Kluger, 1998).

Table 3

Core Self-Evaluations

Core Evaluation	Definition
Self-esteem	The overall value one places on oneself

Core Evaluation	Definition
Generalized self-efficacy	One's estimates of one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise general control over events in one's life
Locus of control	The degree to which individuals believe that they control events in their lives (internal locus of control) or believe that the environment or fate controls events (external locus of control)
Neuroticism	A Big 5 trait considered to be the converse of self-esteem and generally refers to a lack of positive psychological adjustment and emotional stability

Adapted from Harter, 1990; Judge & Bono, 2003; Judge et al., 1997; Judge et al., 1998; Rotter, 1966

According to the core self-evaluation theory (Judge et al., 1997), core self-evaluations subconsciously influence how individuals process information and interpret their environment. Those with higher evaluations tend to feel in control of situations, are better at overcoming obstacles, and are more apt to focus on positive aspects of an event (Judge et al., 1998). Similarly, core self-evaluations influence individuals' perceptions of job characteristics (Judge, Bono, & Locke, 2000), as well as their motivation to perform their jobs (Erez & Judge, 2001; Judge et al., 1998).

Core self-evaluations have been shown to influence work behaviors in both lab and field settings. Through a series of studies, Erez & Judge (2001) demonstrated that higher core self-evaluations led to increased levels of task performance, task persistence, and goal-commitment. Likewise, those with high core self-evaluations were also more likely to engage in goal-setting activities.

Kamer & Annen (2010) examined the influence of core self-evaluations on performance appraisal outcomes. Specifically, they examined the influence of core self-evaluations on performance appraisal satisfaction and goal-commitment. Their findings revealed that those with higher core self-evaluations reported higher satisfaction with their performance appraisal as well as increased goal-commitment.

I propose that core self-evaluations will influence the extent to which self-focused upward counterfactual thinking effects performance. Because those with higher core self-evaluations feel more capable of mobilizing a course of action and cognitive resources, are less fearful of novel situations, and have increased confidence in their abilities (Bono & Judge, 2003; Judge et al., 1998), it is likely core self-evaluations will influence whether individuals transfer the benefits of self-focused upward counterfactual thinking to performance efforts. Following this logic and consistent with the review of the effects of core self-evaluations on task behaviors, I hypothesize:

Hypothesis 6: Core self-evaluations moderate the influence of self-focused upward counterfactual thinking on performance, such that the influence of self-focused counterfactual thinking becomes more positive as core self-evaluations increase.

Counterfactual specificity. Counterfactual thinking enables individuals to mentally simulate how alternative behaviors might have led to different outcomes. I argue that the specificity level of such simulations (i.e. the counterfactuals) plays an important role in determining whether the counterfactuals influence performance. More

specifically, I argue that detailed and specific (i.e. concrete) counterfactuals, rather than vague and abstract, will more positively effect performance. Theory and findings in the goal-setting literature, namely goal-setting theory (Locke & Latham, 1990), as well as findings from implementation intention (Gollwitzer & Sheeran, 2006) and counterfactual thinking research (Smallman, 2013), illustrate the value of specificity during mental simulations.

Goal-setting research (Locke & Latham, 2002) has found that specificity contributes to the effectiveness of goals. According to goal-setting theory (Locke & Latham, 1990), specific goals help to reduce ambiguity about what has to be achieved. Thus, specific goals direct effort and attention during the pursuit of a task. It is likely that the specificity of counterfactuals will regulate effort, attention, and behavior similarly, thus leading to stronger effects on performance.

I further propose that detailed and specific counterfactuals will exert effects on behaviors similar to those of implementation intentions. Implementation intentions have been defined as if-then plans that connect good opportunities to act with cognitive or behavioral responses that are useful for accomplishing goals (Gollwitzer & Sheeran, 2006). Implementation intentions specify when, where, and how one intends to achieve the goal, rather than merely specifying an intended outcome (i.e. a goal intention). The detail and specificity of such thoughts create a stronger link in memory compared to vague and abstract thoughts (Sheeran et al., 2005). As a result, individuals are more apt to engage in goal-directed behaviors when the opportunity presents. Gollwitzer & Sheeran

(2006) documented empirical support for this notion in a fairly recent meta-analysis.

I propose that there are parallels between implementation intentions and counterfactuals. Both thought processes evoke if-then conditionals that serve as self-regulatory guides for behavior. As such, I argue that when counterfactuals are detailed and specific, they will exert a stronger influence on performance.

A recent study (Smallman, 2013) in the counterfactual thinking literature offers empirical support for my argument. In a series of five studies, Smallman demonstrated that counterfactual content influences the extent to which counterfactuals elicit relevant behavioral intentions. The level of detail and specificity of counterfactuals were among the content aspects examined. The findings revealed that when counterfactuals are detailed and specific, they are more likely to evoke behavioral intentions. According to the theory of planned behavior (Ajzen, 1991), behavioral intentions indicate the extent to which one will work hard and expend effort for performance.

Based on the theory of planned behavior (Ajzen, 1991) and building on Smallman's (2013) finding, as well as the parallels between implementation intentions and counterfactuals, I predict that:

Hypothesis 7: Counterfactual specificity moderates the influence of self-focused upward counterfactual thinking on performance, such that the influence of self-focused counterfactual thinking becomes more positive when counterfactual specificity includes a detailed/specific behavioral description.

Conditional Indirect Effects.

Recall that the overall goal of this research is to offer a more complete picture of the effects of reflection. To this end, I have hypothesized boundary conditions that are believed to influence the extent to which individuals engage in self-focused upward counterfactual thinking following a performance discrepancy, as well as those that are believed to influence the extent to which such thinking affects performance. Because the proposed relationships are contingent on boundary conditions, so too is the hypothesized indirect effect in the proposed research model (Hayes, 2012).

Stated differently, I argue that the indirect effect of self-focused upward counterfactual thinking in the baseline performance discrepancy—performance relationship is dependent on the values of the proposed moderators. Thus, I have proposed above moderated mediation (James & Brett, 1984) or, in other words, a conditional process model (Hayes & Preacher, 2013). A conditional process model attempts to explain both how and when an effect occurs (Hayes, 2013) and can, therefore, offer valuable insight into complex relationships.

Assuming task-relevant knowledge, psychological empowerment, and feedback specificity moderate the association between baseline performance discrepancy and self-focused upward counterfactual thinking, it is expected that these constructs will conditionally influence the strength of the indirect relationship between baseline performance discrepancy and performance. Likewise, assuming that core self-evaluations and counterfactual specificity moderate the relationship between self-focused upward

counterfactual thinking and performance, it is likely these moderators will influence the association between baseline performance discrepancy and performance. Because the variables in my proposed research model are expected to demonstrate a pattern of moderated mediation, I present and will test the following hypotheses:

Hypothesis 8a: Task-relevant knowledge will moderate the positive and indirect effect of baseline performance discrepancy on performance, through self-focused upward counterfactual thinking. Specifically, self-focused upward counterfactual thinking will mediate the indirect effect when task-relevant knowledge is high but not when it is low.

Hypothesis 8b: Psychological empowerment will moderate the positive and indirect effect of baseline performance discrepancy on performance, through self-focused upward counterfactual thinking. Specifically, self-focused upward counterfactual thinking will mediate the indirect effect when psychological empowerment is high but not when it is low.

Hypothesis 8c: Feedback specificity will moderate the positive and indirect effect of baseline performance discrepancy on performance, through self-focused upward counterfactual thinking. Specifically, self-focused upward counterfactual thinking will mediate the indirect effect when feedback specificity is low but not when it is high.

Hypothesis 8d: Core self-evaluations will moderate the positive and indirect effect

of baseline performance discrepancy on performance, through self-focused upward counterfactual thinking. Specifically, self-focused upward counterfactual thinking will mediate the indirect effect when core self-evaluations are high but not when core self-evaluations are low.

Hypothesis 8e: Counterfactual specificity will moderate the positive and indirect effect of baseline performance discrepancy on performance, through self-focused upward counterfactual thinking. Specifically, self-focused upward counterfactual thinking will mediate the indirect effect when counterfactual specificity is high but not when it is low.

CHAPTER THREE: RESEARCH METHODOLOGY

In this chapter, I introduce the research methodology used to examine the research model discussed in Chapter 2 (see Figure 2). The details of my study are organized into three sections. The first section provides details pertaining to the design and data collection, which includes a discussion of the simulation I created to test my research model and the identification of sample participants. The second section introduces the study's independent, dependent and control measures. The final section details the statistical method used to analyze and interpret the data.

Research Design and Data Collection

Research Setting.

To test the conceptual model, I designed, developed, and validated a social interaction simulation and administered it via a virtual experiment (Harrison, Lin, Carroll, & Carley, 2007) to study participants. Simulations are more standardized than observations, as well as other forms of behavioral evaluations, and are an effective means of studying behavior (Thornton & Cleveland, 1990). Simulations have enabled management scholars to replicate the core features of an activity and to elicit overt behaviors from participants, while pursuing highly focused research and controlling for extraneous effects (Secchi, 2015; Thornton & Cleveland, 1990). These immersive

technology tools have been used extensively to examine aspects of the learning process, such as the effects of reflection interventions (e.g. Anseel et al., 2009; Ellis et al., 2006, 2009), as well as in other management research such as feedback, empowerment, and individual work performance (Biron & Bamberger, 2010; Goodman et al., 2004, 2011). Scholars have included an array of simulated tasks in management studies, for instance electronic workplace correspondence (Anseel et al., 2009), complex decision-making endeavors (Ellis et al., 2009), strategic planning (Ellis et al., 2006), and operational activities (Goodman et al., 2011). In the current study, a simulated leadership skills task was designed, developed, validated, and implemented. I introduce the details of such in the following sections.

Simulation Overview and Development.

Simulation overview. The simulation, developed via SimWriter® immersive learning technology, was comprised of a series of discrete simulated social interactions designed to capture realistic workplace interactions and to facilitate assessment of leadership skill proficiency. Research participants assumed the role of a manager, Pat Reese, and interacted with subordinates in a virtual organization. Participants demonstrated their leadership skill by responding to interactions in the leadership role. They chose a response from a series of provided potential responses. Following the participant's selection, and using conversation branching rules similar to those of a decision-tree structure, the simulated subordinates then replied to the participant with comments tailored to the participant's response selection.

I designed the simulation to assess two leadership skills, negotiation and management of personnel resources, over task rounds. Each task round included six interactions (i.e. conversations), comprised of up to 25 opportunities (i.e. decision points) for participants to demonstrate their negotiation skill proficiency and up to 24 opportunities to demonstrate their management of personnel resources skill proficiency. The underlying critical incidents and details of some interactions were inspired by negotiation, management, and supervisory case studies and role-plays (Asherman & Asherman, 2004; Clandy, 1994; Lewicki, Barry, & Saunders, 2015), whereas others were inspired by conversations with management scholars and industry professionals with management experience. Upon executing a trial run of the simulation and based on its length, approximately two hours, as well as the results of the skill-domain validation process, the findings for which are discussed in Chapter 4, the negotiation interactions were removed from the final simulation. Thus, the final simulation deployed in this research consisted of three interactions with up to 24 opportunities to demonstrate one's personnel management skills per task round (i.e. six interactions with up to 48 decisions total).

Participants completed the first task round (Time 1) by observing and responding to subordinates during three interactions that reflected situations managers routinely encounter in the workplace. These included situations such as helping subordinates to adjust to organizational changes, to identify root causes of lack of productivity, and to communicate effectively regarding task demands. After the first task round, participants received performance feedback, and subsequently participated in a written reflection

activity. Upon completing the reflection activity, participants advanced to a second task round (Time 2), also consisting of three interactions, to demonstrate their leadership skill performance following reflection. After completing the simulation, participants were debriefed on the purpose of the research.

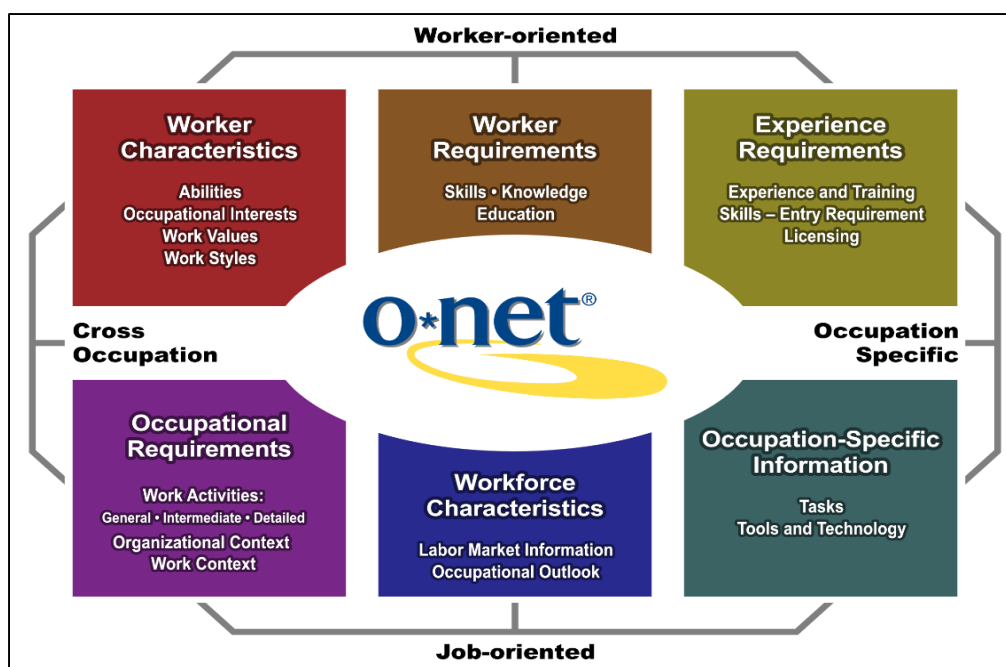
Simulation development. To assure the realism and to enhance the face validity of the simulation, the simulation content and context, such as the job setting, worker details, and skills, were developed using occupational details provided in the Occupational Information Network (O*NET) Content Model (Peterson et al., 2001). O*NET is a comprehensive, theoretically and empirically sound system that provides occupational information for nearly 950 jobs in the United States (National Center for O*NET Development, n.d.). The O*NET Content Model is the conceptual foundation of this system.

The O*NET Content Model (Figure 3) offers a framework for identifying and organizing important information about jobs. Six descriptors are used to organize such information, including: worker characteristics, worker requirements, experience requirements such as skills, occupational requirements, worker characteristics, and occupation-specific information. As such, it encompasses both job-oriented descriptors, as well as worker-oriented descriptors. Likewise, it includes occupational-specific descriptors and cross-occupational descriptors—thus enabling occupational information to be applied across jobs and industries (Mumford & Peterson, 1999). In these ways, the O*NET skills domain provides a common language for leadership skills across job settings. Moreover, the O*NET skills domain integrates decades of academic research

and is considered the most comprehensive skills model from which to draw from when investigating leadership skills (Mumford et al., 199; Mumford et al., 2007, p. 164; Peterson et al., 2001). Therefore, the leadership skills that served as the foundation for the simulation developed for this study are included in the O*NET skills taxonomy and those considered essential for more than 25% of O*NET classified occupations.

Figure 3

*The O*NET Content Model*



*Adapted from National Center for O*NET Development, n.d.*

The choice to focus on leadership skills within my simulation was important for several reasons. Foremost to this point, scholars have stressed the importance of reflection for leadership development (Ashford & DeRue, 2012; DeRue et al., 2012) and have drawn attention to the leadership talent deficit common across many organizations.

Ashford & DeRue (2012) reported up to 70% of North American employers lack sufficient leadership skills within their workforces. Similarly, recent reports indicate the deficit is widening in every region of the world, with 86% of HR leaders citing leadership as their number one challenge (Deloitte University Press, 2015). Due to such findings, it was practically relevant and important to investigate the extent to which counterfactual reflection influences how one may learn from feedback and improve performance on leadership tasks.

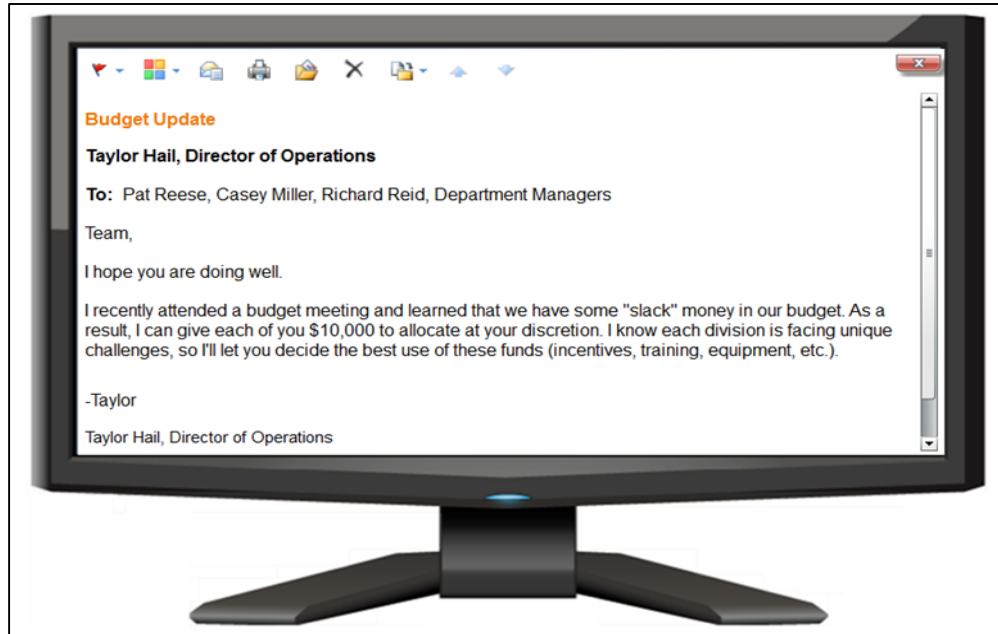
It was also important to capture reality while investigating these issues via computer simulation (Secchi, 2015). To this point, the simulation reflected careful consideration of design properties that contribute to psychological realism (Colquitt, 2008). Specifically, I included vivid and engrossing interactions, accompanied by detailed background information, graphics, and audio-video content. To illustrate, Figures 4 and 5 below provide sample simulation content.

Figure 4

Sample Simulation Audio-Video Content: Manager - Employee Interaction



Figure 5

Sample Simulation Graphic: Manager's Email Correspondence

Email content adapted from Eylon & Herman, 1999

Additionally, I filmed the audio-video content in a realistic workplace setting. Specifically, I obtained permission from a local business to use their facilities to film each simulated interaction. There, I filmed 186 scenes, which featured 13 actors of varying ages, ethnicity, and gender. I chose actors for the simulated interactions from available volunteers, friends, and family. These actors were age appropriate for the role they played in the simulation.

Recall that as participants engaged in simulated interactions, they received multiple responses from which to choose. I designed the simulation such that each response option reflected varying degrees of leadership skill effectiveness. To assure the response options reflected varying levels of skill proficiencies, I developed and validated

behaviorally anchored rating scales (BARS) (Smith & Kendall, 1963), as described in the next section, which I used to guide the design of participant response options.

Subsequently, I used the scales to validate the corresponding response option scores used for performance score calculations in the final simulation.

In addition to the careful development of participant response options, the design of the current study required two complete task versions (Time 1 and Time 2 tasks) to test the effects of counterfactual reflection on leadership skill performance. It was important, therefore, to ensure that Time 1 tasks (i.e. three interactions per skill category) were equivalent in complexity to those presented at Time 2. To develop such, I followed an incident isomorphic cloning procedure (Clause, Mullins, Nee, Pulakos, & Schmitt, 1998; Lievens & Sackett, 2007) that has been supported as an effective means of developing alternate assessments (Lievens & Anseel, 2007) and has been implemented in prior management reflection studies (Anseel et al., 2009).

The incident isomorphic cloning procedure is grounded in item generation theory, which posits that the items that comprise test forms (in this case simulated interactions) contain both radicals and incidentals (Kyllonen, 2002). Radicals are structural features that determine item difficulty, whereas incidentals are surface details and characteristics that do not influence item difficulty (Dennis et al., 2002; Irvine et al., 1990; Lievens & Sackett, 2007). Based on the role of these factors, the incident isomorphic cloning procedure consists of developing alternate task items by generating item variants that retain the radicals (features that determine item difficulty) while altering the incidentals (surface details) (Lievens & Anseel, 2007). Specifically, when following this approach,

the skill domain and the critical incident are considered radicals that impact item difficulty. Conversely, the context of the incident, as well as linguistic and grammar changes to the context in which the incident is embedded and the ways of responding to the incident, are incidentals (Lievens & Sackett, 2007). Consequently, these were the incidentals of focus when I developed item variants for the alternate simulated interactions.

As such, the incident isomorphic cloning procedure yielded alternate task measurement items (i.e. task rounds) that were based on the same critical incident yet appeared superficially different. Although superficial details varied between task items, by using behaviorally anchored rating scales as the foundation for generating the original and alternate task items, I generated psychometrically equivalent task rounds. I now discuss the steps for developing and validating the behaviorally anchored rating scales, followed by the simulation validation protocol.

Behaviorally Anchored Rating Scales.

Behaviorally anchored rating scales are assessment tools that capture performance in multi-dimensional, behavior-specific terms (Schwab, Heneman, & DeCotiis, 1975) and provide raters with behavioral descriptions that exemplify varying degrees of each dimension (Smith & Kendall, 1963). BARS are designed to standardize observation and rating processes (Smith & Kendall, 1963; Jacobs, Kafry, & Zedeck, 1980). Additionally, scholars consider BARS useful when providing feedback, as the scales provide concrete examples of job behaviors that can be improved (Cummings & Schwab, 1973). To these

points and to support one of my primary design goals—to design a simulation that includes participant response options with varying levels of skill proficiencies and an empirically sound scoring scheme—I developed behaviorally anchored rating scales for the negotiation and the management of personnel resources skill domains.

Scholars have long argued that BARS cannot be developed in a haphazard fashion (Bernardin & Smith, 1981). Rather, the development procedure for BARS is a multi-step process that draws upon the expertise of those with knowledge of the job and integrates feedback from those who will use the scales for observation and rating purposes. Because the focal skill domains in my simulation (see Table 4 below) are well documented, and some behavioral descriptions were adapted from BARS utilized in prior studies (Mero & Motowidlo, 1995), I employed a variation of multi-step BARS development procedures that have been implemented in prior studies (Schwab et al., 1975; Smith & Kendall, 1963), which I now describe.

Table 4

Leadership Skills Included in Simulation Development

Skill	Definition
Negotiation	bringing others together and trying to recognize differences (Mumford et al., 1999)
Management of Personnel Resources	motivating, developing, and directing people as they work (adapted from Mumford et al., 1999)

Step 1: For each skill domain, I identified specific illustrations of effective and ineffective behavior. To this end, I reviewed relevant literature and resources, as well as established BARS, that included the two leadership skills assessed in my simulation.

Following this approach, I identified critical incidents for each skill domain from multiple scholarly sources, as well as (“Coaching,” SIOP, 2016; Hill, 1997; Lewicki et al., 2015; Lewicki, Saunders, & Barry, 2011; Mero, 1994; Noe, Hollenbeck, Gerhart, & Wright, 2014).

Step 2: Based on the critical incidents identified in Step 1, I generated behavioral statements that illustrated specific behaviors at low, moderate, and high levels of skill proficiency. Each level of skill proficiency was assigned numeric point values consistent with a 7-point BARS. For instance, Table 5 illustrates varying levels of skill for motivating and showing sensitivity to employee needs, as well as the corresponding point values.

Table 5

Sample BARS Behavioral Statements

Proficiency Level	Behavioral Statement
High (6 to 7)	Creates work environment that recognizes and rewards employee goal accomplishment and shows sensitivity to employee personal needs
Moderate (3 to 5)	Attempts to motivate others by providing feedback and encouragement and being aware of personal needs
Low (1 to 2)	Does not motivate or encourage others to exert more effort on task accomplishment or recognize personal needs

Step 3: The third step included a retranslation task in which a group of individuals were asked to reallocate the behavioral statements according to the three levels of skill proficiency. Stated differently, they were asked to match each statement to its intended level of proficiency. To this end, I provided the definition of each skill, as well as a

summary of critical incidents associated with each skill, to five judges and asked them to assign each behavioral statement to the level of skill proficiency reflected in the statement. Moreover, I requested their general feedback about any statements that were unclear.

Scholars contend that when users of the BARS participate in this process, it enhances the face validity of the scale, and raters may be “sold” on the desirability of executing future ratings honestly and carefully (Smith & Kendall, 1963). As such, four of the five judges who participated in the retranslation task used the BARS in subsequent rating tasks as part of the simulation validation process, and all five had sufficient qualifications, namely terminal degrees, to participate in the process. Based on their reallocation of the behavioral statements and their general feedback, I revised behavioral statements as necessary. Specifically, three behavioral statements on the negotiation BARS were revised to include a direct reference to conflict, thereby maintaining consistency with other behavioral statements in the scale.

Step 4: After revising the behavioral statements, another group of 10 judges, half of whom were eventual users of the BARS in subsequent rating tasks and all of whom had either a terminal degree or 10+ years of management experience, completed the reallocation task, using the process described in Step 3. In this case, however, there was clear modal agreement for each behavioral statement and consensus that all statements were clear and representative of varying levels of skill performance. Thus, I retained all statements in the final BARS. The final negotiation and management of personnel resources BARS included multiple behavioral statements per proficiency level, five and

four respectively. The final BARS, used to design and to validate the simulation content can be found in Appendix A. I now describe the specific steps taken during the simulation validation process.

Simulation Validation.

Recall that I incorporated O*NET job information in the development of my simulation. Although this responded to calls for research designs that maximize content validity, as well as external validity (Colquitt, 2008; Scandura & Williams, 2000), I also took additional steps to validate the simulation and the effectiveness of the leadership skill scoring rules. More precisely, expert raters conducted independent evaluations of the simulation content, using the behaviorally anchored rating scales described above. The expert raters were comprised of individuals from academia and industry professionals with leadership experience. I conducted three expert rating processes, as shown in Table 5. In the following sections, I provide an overview of each rating process, and I provide the results in Chapter 4.

Table 6

Expert Rater Evaluations

Content Evaluated	Aim of Evaluation/Details
Time 1 and Time 2 tasks	Assess the similarity between the incidents depicted in Time 1 and Time 2 interactions
Participant response options	Determine the ranking of skill effectiveness for each set of response options

Social interactions	Identify the skill domain represented in each interaction <ul style="list-style-type: none"> ○ Time 1 tasks = 6 interactions ○ Time 2 tasks = 6 interactions
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Time 1 and Time 2 tasks cloning. To assure the cloning process yielded two task rounds that were equivalent in complexity, the content of each round was assessed to determine the degree of similarity between Time 1 tasks and Time 2 tasks. Following an established protocol by Lievens & Anseel (2009), five independent raters participated in the rating process.

It was important to assess the similarity of each parallel point of the cloned interactions. As such, the raters evaluated the similarity of the item stems (situations surrounding the interactions) of each original and cloned task item (interaction), as well as the item responses (responses available to participants during the interactions). More precisely, they assessed the similarity of 261 cloned sets, which included: 1) six cloned interaction introductions, 2) 87 cloned simulated character scenes, and 3) 168 cloned participant response options. The similarity of each was assessed using a 7-point scale, ranging from 1 = not at all similar in terms of content to 7 = very similar in terms of content.

Participant response options. I conducted a second rating in which expert raters reviewed the response options presented to participants during the simulation. The goal of this aspect of the review was to assure that the ranking of skill effectiveness presented for the decision points in the interactions represented the intended skill levels (i.e. low, moderate, and high). To this end, I provided raters with the behaviorally anchored rating

scales used during the simulation development process and asked that they assess the behaviors depicted in each response using the provided behavioral scales.

The expert rater group for this task was comprised of 10 individuals. Five assessed the participant response options in first task round, and five assessed the response options in the second task round. More precisely, each rater evaluated 168 participant response options of varying skill proficiencies, namely 56 high, 56 moderate, and 56 low-skill proficiency response options.

The data generated via the rater evaluation process was analyzed using an analysis of variance (ANOVA), which provided an empirical test of whether there were significant differences between the low, moderate, and high skill proficiencies reflected in the response options at each decision point during the interactions.

Social interactions. To validate the simulated social interactions, I adapted a content validity assessment procedure suggested by Hinkin & Tracey (1999) to empirically test the skills reflected in each social interaction. I asked a group of raters to examine the content of the simulation and to identify the skill domain captured in each interaction. More precisely, 30 raters assessed the extent to which each social interaction captured the negotiation skill domain, as well as the extent to which each interaction captured the management of personnel resources skill domain, using a 5-point Likert type scale ranging from 1= not at all to 5= completely. The raters were also asked to classify each interaction as either a negotiation interaction or a management of personnel resources interaction.

Cloning effectiveness pilot study. The final step in the simulation validation process was a pilot study designed to provide further verification that the cloning procedure used to generate alternate task versions for Time 1 and Time 2 was effective. Based on the results of the skill domain rating task and the projected length of the full simulation, the negotiation interactions were not included in the pilot study, nor the final simulation. With the condensed simulation consisting of six management of personnel resources interactions (i.e. three per round), I collected data to test whether mean performance on the two task rounds was comparable as viewed by non-expert participants. In prior research, undergraduate students and, in some cases, college applicants have been used to assess differences between alternate test versions (e.g. Lievens & Anseel, 2007; Lievens, Buyse, & Sackett, 2005; Lievens & Sackett, 2007). Following this practice, my pilot study sample was comprised of undergraduate business students, and all received extra credit for their participation.

Participants completed both task versions in a counterbalanced order, and I collected 58 usable responses. This provided a sufficient number of observations to determine if there were significant differences between mean performance on each task round (Hair, Black, Babin, & Anderson, 2010). Specifically, I analyzed the data with a 2 (order: normal vs. reversed) X 2 (task: Time 1 vs. Time 2) mixed ANOVA, with repeated measures on the last factor and performance as the dependent variable. I discuss the results in Chapter 4.

Reflection Prompt Pilot Study.

I conducted a second pilot study to test the effectiveness of the reflection prompt (see Appendix B). The sample was comprised of 12 undergraduate business students (58% female, 42% male). They were provided the counterfactual reflection prompt and were asked to reflect on their performance during a leadership and teamwork simulation, completed as part of a junior-level organizational behavior course. The content of their reflections confirmed that the reflection instructions were effective for prompting counterfactual thoughts. As such, I determined that the prompt was acceptable for my final data collection.

Final Data Collection.

The sample to test my hypotheses was comprised of both graduate and undergraduate students, recruited from multiple U.S. universities. Prior reflection studies in the management literature (e.g. Anseel et al, 2009; Ellis et al., 2006, 2009), including DeRue et al. (2012) who examined the influence of reflection on leadership development, have included student samples. Similarly, the use of student samples is common practice throughout counterfactual thinking research (e.g. Markman et al., 1995; Roese & Olson, 1993; Sanna, 1997; Smallman & Roese, 2009). More importantly, I selected a student sample for my study due to recent industry reports, which indicate that organizations consistently struggle to develop leadership skills across all levels—particularly among millennial leaders (Deloitte University Press, 2015). Additionally, Mumford, Campion, & Morgeson (2007) have demonstrated that leadership skills are needed at all

organizational levels, and the leadership skills included in my research are those needed at all levels of organizational strata—including junior (1-5 years of experience), mid (6-20 years), and senior (21+ years) levels (Mumford et al., 2007). Thus, graduate and undergraduate students, whose experience levels are represented in such strata, were an appropriate sample for this study.

To encourage individuals to participate, I highlighted that the skills on which they were assessed are skills often evaluated in employment selection processes (Lievens & Anseel, 2007). I also informed participants that workplace simulations are often used in professional settings to develop individuals for management positions (Anseel et al., 2009). Thus, through their participation, they had the opportunity to test their skill levels relative to those desired in selection and promotion decisions. I assured participants that their survey responses, performance scores, and reflection content would remain confidential. Additionally, students received extra credit for participation, when permitted by their instructors and the policies of their respective institutions.

The faculty who assisted with the recruitment process provided the participation link to their students directly and, in some cases, posted to the link universities' learning management systems (e.g. Blackboard®). The participation link remained active for four weeks, and a total of 613 students (136 graduate; 483 undergraduate) were invited to participate in the study.

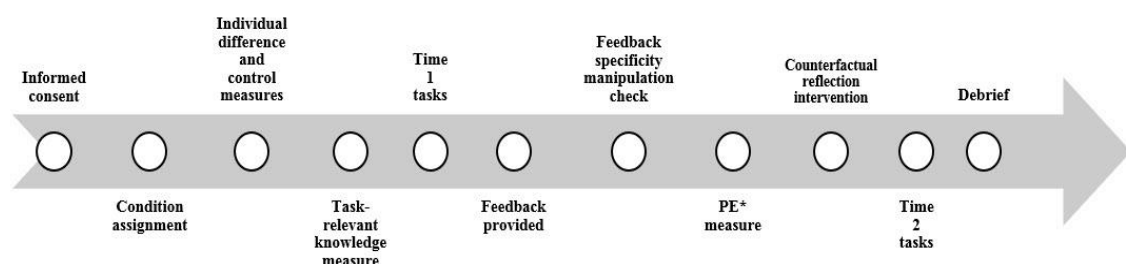
Of the 613 students invited to participate, 251 students (41%) provided their consent to participate in the study. Due to technology reporting failures, 18 cases were missing substantial amounts of data (i.e. >50%) and, consequently, were removed from

the final data set. Additionally, 34 participants completed the initial survey measures, described in the next section but failed to proceed to the simulation. Of the remaining 199 participants who completed the initial survey measures and launched the simulation, three terminated their participation via an “early exit” option within the simulation, and 27 dropped out without confirming their intent to exit. High incompleteness rates have been found in prior web-based simulation studies (e.g. Anseel et al., 2009); however, through follow-up inquiries with assisting faculty, I learned that some participants did not adhere to instructions related to mobile device incompatibility. As such, the 27 dropouts who did not confirm their intent to exit may have exited because of compatibility issues. In sum, I collected 169 usable responses, 34% from graduate students and 66% from undergraduate students, which captured the full data collection process.

Figure 6 illustrates the full data collection process. I have illuminated each stage of the data collection process in the figure. In the following sections, I introduce the details of each stage.

Figure 6

Data Collection Process



* PE=psychological empowerment

Informed consent and condition assignment. Data collection complied with all policies and procedures set forth by the Institutional Review Board at Kennesaw State University. Participants provided informed consent to their participation. Data were collected using web-based survey software, as well as a web-based simulation developed with Tin Can xAPI learning technology specifications.

As stated previously, participants assumed the position of a manager in a simulated organization. I randomly assigned participants to one of six conditions within the simulation, as shown in Table 7. These included manipulations of feedback specificity and psychological empowerment antecedents, such as autonomy support from leader, peer support, and resource availability (Laschinger, Finegan, Shamian, & Wilk, 2001; Seibert et al., 2011).

Table 7

<i>Experimental Conditions</i>	
Condition	Details
1	Low psychological empowerment, low feedback specificity
2	Low psychological empowerment, moderate feedback specificity
3	Low psychological empowerment, high feedback specificity
4	High psychological empowerment, low feedback specificity
5	High psychological empowerment, moderate feedback specificity
6	High psychological empowerment, high feedback specificity

Individual difference, control, and task-relevant knowledge measure. Prior to beginning the simulation tasks, participants completed a core self-evaluation self-report survey (see Appendix C), as well as other individual difference measures for relevant control variables (see Appendices D-F). Additionally, participants completed an assessment designed to measure task-relevant knowledge (see Appendix G). After

completing the survey items, I directed participants to the webpage with the social interaction simulation, where they proceeded to Time 1 tasks.

Time 1 tasks. Participants demonstrated their management of personnel resources skills across three social interactions. During each task, participants interacted with a simulated employee and, to facilitate communication with the employees, were provided multiple responses from which to choose. Each response option reflected varying degrees of leadership skill effectiveness and had a point value associated with its effectiveness level (i.e. low = 1 point, moderate = 4 points, high = 7 points).

Feedback provided. Web-based software tracked and recorded the participants' responses. Additionally, the software tracked the corresponding score for each response, which it used to generate an overall performance score for Time 1 tasks. Upon completing the Time 1 tasks, the computed performance scores, as well as simulation-generated performance feedback was provided to the participants. The content of the feedback varied based on the condition in which the participant was assigned.

Manipulation check and psychological empowerment measure. After participants received their performance feedback, they completed a feedback specificity manipulation check (see Appendix H). Likewise, to help assess the extent to which psychological empowerment influences self-focused upward counterfactual thinking, participants provided self-reported psychological empowerment data (see Appendix I) prior to the reflection intervention.

Counterfactual reflection intervention. When participants completed the feedback specificity manipulation check, as well as the psychological empowerment survey, the

simulation directed them to a counterfactual reflection intervention. The reflection intervention protocol included a reflection prompt, and I designed the simulation such that participants could not proceed to Time 2 tasks until they had spent at least five minutes on the reflection activity. I subsequently analyzed the reflection content provided by participants to assess the extent to which they engaged in self-focused upward counterfactual thinking. I discuss the process used to analyze the reflection content in the measurement section.

Time 2 tasks. After participants completed the written reflection activity, they proceeded to Time 2 tasks that consisted of three social interactions (i.e. clones of Time 1 tasks). Participants' responses and scores were recorded and tracked, using the same process as Time 1.

Debrief. The experiment concluded with a debriefing, which was facilitated by the simulation. The content of the debrief included a general description of the purpose of the research which protected details that, if shared with others, could potentially prime prospective participants. Specifically, participants were informed that the purpose of the research was to determine if actions and thoughts taken early in the simulation influenced subsequent behaviors.

Common Method Variance.

My data collection process mitigated the threats associated with common method variance (CMV), the variance attributed to the method of measurement (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Specifically, my study included an objective

measure of performance. As such, the measurement of the criterion variable was separated from the source of the predictor measurement. In the following section, I discuss the details of each measure.

Measures

Independent Variable.

Baseline performance discrepancy. After completing Time 1 tasks, participants received instant feedback on their Time 1 performance, which the computer simulation software automatically generated. The feedback addressed their baseline performance discrepancy, the difference between participants' performance on Time 1 tasks and the desired performance (i.e. 100%). Thus, I operationalized baseline performance discrepancy as the extent to which Time 1 performance was below the target score, which was computed as: the target score minus Time 1 performance score earned. To illustrate, if a participant earned a score of 77% on Time 1 tasks, then the baseline performance discrepancy was 23. I now describe the process for calculating their performance below.

Dependent Variable.

Performance. Recall that, throughout the interactions, participants selected their preferred responses from provided options. As previously described, I assigned each response varying points based on skill effectiveness (i.e. low = 1 point, moderate = 4 points, high = 7 points). Performance, the dependent variable, represented the overall score (i.e. percentage) earned on Time 2 tasks, which was tracked and reported by the simulation software.

Mediating Variable.

Self-focused upward counterfactual thinking. Self-focused upward counterfactual thoughts are thoughts about how one could have attained a better outcome by altering his or her behavior. To measure self-focused upward counterfactual thinking, I followed established coding procedures (e.g. Roese & Olson, 1993, 1995; Scholl & Sassenberg, 2014). Two independent coders, blind to the subjects' treatment condition or scores on any of the study's measures, qualitatively assessed the respondents' reflections and coded the referent focus (i.e. self-, other-, or situation- focused), as well as the direction of each counterfactual thought. Prior to coding, the coders received training on the coding task as well as the coding rules.

Following the training and rules provided, the coders identified whether each thought was a counterfactual. When counterfactuals were identified, the coders proceeded to determine whether the counterfactual referent was self-, other-, or situation-focused. They coded counterfactual thoughts that specified alternatives to the respondents' behavior as self-focused. In contrast, counterfactual thoughts that focused on alternatives to another person's (e.g. the simulated person's) behavior were coded as other-focused. Situation-focused thoughts included thoughts that referred to situational details or both actors (Scholl & Sassenberg, 2014) and were coded as such.

Additionally, the coders identified the direction of counterfactual thoughts. They coded counterfactual thoughts that specified an outcome better than the actual outcome as an upward counterfactual. Conversely, they coded counterfactual thoughts that specified an outcome worse than the actual outcome as a downward counterfactual.

The coding process resulted in the frequency of each type of counterfactual thought. The current study examines the influence of self-focused upward counterfactual thinking on performance. Therefore, the percentage of such thoughts relative to the participants' total thoughts (i.e. lines of reflection text) was the measurement focus of interest and the operationalization of self-focused upward counterfactual thinking.

Following the process described, the coders evaluated 553 lines of text. To determine if there was agreement between the coders on whether the 553 lines of text contained counterfactual thoughts, I assessed Cohen's k , which takes into account chance agreement and is appropriate when the aim is to assess absolute agreement between two coders (Cohen, 1960; Hallgren, 2012). The two coders agreed that 178 lines contained counterfactual thoughts and 322 lines lacked such thoughts. There was substantial agreement between the two coders' judgement (Landis & Koch, 1977), $k = .79$ (95% CI, .75 to .85), $p < .001$.

Despite substantial agreement, the coders disagreed on 53 lines of text. As such, a third coder, whom received the same coding rules and training as the two primary coders, evaluated the items in question to resolve coding disagreements. Using a majority decision rule, 37 of the 53 lines were determined to contain counterfactual thoughts, whereas 16 did not. Thus, the total number of counterfactual thoughts identified was 215.

As stated, the coders also determined the referent and direction of the counterfactuals. Recall that, when identifying counterfactual thoughts, the two primary coders agreed upon 178 counterfactuals. Their agreement on which type of counterfactual

(i.e. the referent-direction) reflected in these thoughts was very good, $k = .91$ (95% CI, .85 to .97), $p < .001$.

Similar to the process previously described, a third coder resolved coding disagreements. To better illustrate the frequency of the types of counterfactuals participants generated and, in particular, the number of those that represent the mediating variable in this study, Table 8 summarizes the total number of each type of counterfactual identified and provides a sample statement for each:

Table 8

Counterfactuals Identified in Participants' Reflections

Type of Counterfactual	Total	Sample Participant Statement
Self-focused upward (<i>mediating variable</i>)	132	When talking to each of the employees I could have had a better two-way conversation in order to help each of them with their problem(s).
Self-focused downward	8	Had I been more direct and curt, I think employees would have been on the defensive and that is not how I want to run this department.
Other-focused upward	6	Some of the performers weren't very clear with their responses and if they were that would of helped out a lot.
Other-focused downward	0	n/a
Situation-focused upward	69	If there would have been a script button, I would have been able to follow along and pick up more of the details of the situation being presented.
Situation-focused downward	0	n/a
TOTAL=	215	

Moderating Variables.

Task-relevant knowledge. Due to the need for a task-relevant knowledge measure that aligned closely with the simulation tasks, I developed the measure for this variable

specifically for this study. The behavioral statements in the management of personnel resources behaviorally anchored rating scale served as the foundation for this measure. Participants completed a 11-item self-report measure, in which they were asked to rate the extent to which their professional training and experience provided them the knowledge to engage in the tasks commonly performed to manage personnel resources. The tasks included in the measurement items paralleled those in the behaviorally anchored rating scales and, thus, were derived from scholarly sources (“Coaching,” SIOP, 2016; Hill, 1997; Lewicki et al., 2015, 2011; Mero, 1994; Noe et al., 2014). Items were rated on a 7-point Likert response format scale (1 = strongly disagree to 7 = strongly agree), and sample items included, (a) “Create a work environment that recognizes employee goal accomplishment” and (b) “Develop employees by correcting their weaknesses.” I provided the full measure in Appendix G.

Extant literature has demonstrated that job experience influences task-relevant knowledge. More precisely, job experience contributes to the acquisition of such knowledge (Schmidt, Hunter, & Outerbridge, 1986). To this point, scholars (e.g. Ahearne, Mathieu, & Rapp, 2005) have included job experience measures when operationalizing task-relevant knowledge. Following this research, I collected the months of supervisory experience for each participant as a supplemental indicator of task-relevant knowledge.

Psychological empowerment. As previously discussed, I manipulated antecedents of psychological empowerment within the simulation. Specifically, participants who were randomly assigned to the high empowerment condition received email correspondence

within the simulation that suggested they had a high level of: (a) autonomy support from leader, (b) peer support, (c) resource availability, and (c) recognition, all of which are psychological empowerment antecedents (Seibert et al., 2011). Conversely, those in the low empowerment condition received email correspondence that suggested a lack of such. I adapted some of the email content from Eylon and Herman (1999), whereas I created other content specifically for this study. I have provided sample manipulations in Table 9.

Table 9

Sample Manipulations of Psychological Empowerment Antecedents

Condition	Sample Email Content
High	<p>From: Taylor Hail, Director of Operations To: Pat Reese, Department Manager- Division 1 Subject: Client Satisfaction Numbers Are In!</p> <p>Great work, Pat! I just glanced at the results of our recent client satisfaction report and your department is in the top spot again! I really appreciate all your hard work, as well as the guidance and support you provide to your team. You have really done a great job with them. Keep up the good work!</p> <p>- Taylor</p>
Low	<p>From: Taylor Hail, Director of Operations To: Pat Reese, Department Manager- Division 1 Subject: Client Satisfaction Numbers Are In</p> <p>Alright, Pat, I just glanced at the results of our recent client satisfaction report and your department is lagging behind the other divisions. It's obvious you're not giving your team the guidance they need. Your recent attempts to improve performance appear to have had minimal effect. It is time to try a different approach.</p> <p>- Taylor</p>

Similar to some field-setting psychological empowerment interventions (e.g. Logan & Ganster, 2007), the manipulations in the current study targeted three of the four dimensions of psychological empowerment, namely competence, self-determination, and impact. Although the meaning dimension additively contributes to overall psychological empowerment (Spreitzer, 1995), manipulations did not target this dimension.

I made the choice to exclude manipulations that targeted the meaning dimension after thoughtful consideration of the essence of this dimension. The meaning dimension involves an individual's "*intrinsic* caring about a given task" and reflects an individual's assessment of a task in relation to his or her *own* ideals and values (Spreitzer, 1995; Thomas & Velthouse, 1990, p. 672). Thus, I expected that individuals would naturally vary on this dimension independent of the manipulations provided during the study.

I assessed the influence of the empowerment manipulations with an adapted version of the Psychological Empowerment in the Workplace Scale (Spreitzer, 1995), as provided in Appendix I. Participants were instructed that their focal role for the scale items was their role in the simulation. The scale included 12-items, measured with a 7-point Likert response format.

Feedback specificity. Participants were randomly assigned to a low, a moderate, or a high feedback specificity condition. To manipulate feedback specificity, I followed established protocol (Davis et al., 2005; Feys et al., 2011; Goodman et al., 2011; Northcraft, Schmidt, & Ashford, 2011). Participants in the low specificity condition received objective performance feedback and a brief, vague explanation of their performance. Those in the moderate condition received their score, as well as feedback

that included error signal information to direct their attention to possible causes of errors or ways to prevent errors in future tasks. The high feedback specificity condition included the same feedback as the moderate condition, in addition to detailed feedback on correct (incorrect) behaviors exhibited during multiple decision points in the simulation. I have provided a sample feedback message for each condition in Table 10.

Table 10

Sample Feedback Messages

Condition	Sample Feedback Message
Low Feedback Specificity	You received a low score, 57%, on ‘management of personnel resources,’ which indicates that you were unable to motivate, develop, and direct people as they work. This means that you did not assist employees in performance improvement and skill development nor recognize and reward goal accomplishment.
Moderate Feedback Specificity	You received a low score, 57%, on ‘management of personnel resources.’ This means that you did not display appropriate behaviors when trying to motivate, develop, and direct people as they work. People like you who achieved a low score on ‘management of personnel resources’ are not yet capable of putting into practice the behaviors needed to assist employees in performance improvement and skill development and to recognize and reward goal accomplishment. In the future, when trying to manage personnel resources, try to assist employees in developing insight for performance improvement, to create balanced conversations for constructing development plans, and to be attentive to their needs and capabilities.
High Feedback Specificity	<p>You received a low score, 57%, on ‘management of personnel resources.’ This means that you did not display appropriate behaviors when trying to motivate, develop, and direct people as they work. People like you who achieved a low score on ‘management of personnel resources’ are not yet capable of putting into practice the behaviors needed to assist employees in performance improvement and skill development and to recognize and reward goal accomplishment. For instance, the following behaviors were noted during your interactions:</p> <ul style="list-style-type: none"> • Although you attempted to motivate Laura, you failed to recognize and reward her goal accomplishment.

	<ul style="list-style-type: none"> • In your conversation with Alex, you missed opportunities to engage Alex in a two-way developmental conversation and to recognize her personal needs. • In some instances, you failed to motivate and to encourage Michael, as well as to utilize questioning techniques for developing a path for his improvement. <p>In the future, when trying to manage personnel resources, try to assist employees in developing insight for performance improvement, to create balanced conversations for constructing development plans, and to be attentive to their needs and capabilities.</p>
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To assess whether the manipulations of the three feedback specificity conditions were effective, I adapted two manipulation check items, measured on a 5-point Likert scale (1= strongly disagree to 5 = strongly agree), from Goodman et al. (2004, 2011): (a) “I received detailed feedback about my performance as a unit leader” and (b) “I was given specific feedback about my performance as a unit leader.” The original items are presented in Appendix H.

Core self-evaluations. I measured core self-evaluations with a 12-item measurement, developed by Judge et al. (2003). Participants responded to 12 items using a 5-point Likert scale (1= strongly disagree to 5= strongly agree). Sample items included: “Sometimes, I do not feel in control of my work” and “When I try, I generally succeed.” The measure is provided in Appendix C.

Counterfactual specificity. Counterfactual specificity refers to the extent to which counterfactuals provide a concrete behavioral description, rather than an abstract behavioral description. Thus, I operationalized counterfactual content as the proportion of concrete behavioral descriptions included in participants’ counterfactual thoughts relative

to their total number of counterfactual thoughts. Similar to other measurement aspects of the counterfactuals, two independent coders, whom received training and coding rules, qualitatively assessed the content of the counterfactuals to determine the level of specificity reflected in each thought. The coders rated each counterfactual thought on the extent to which it included a particular course of action (i.e. a specific behavior), using a 5-point Likert response format scale ranging from 1 (strongly disagree) to 5 (strongly agree).

I assessed Cohen's k (Cohen, 1960) to determine if there was agreement between the coders on whether the counterfactual thoughts contained specific behaviors. There was substantial agreement between the two primary coders (Landis & Koch, 1977), $k = .79$ (95% CI, .75 to .85), $p < .001$. For each item in which there was a lack of agreement (i.e. the coders did not code it the exact same), I calculated a mean counterfactual specificity rating from the two ratings. When determining the proportion of specific counterfactuals out of the total number of counterfactual thoughts, I included counterfactuals that rated greater than or equal to four, and the final measurement value was the ratio of high specificity counterfactuals out of the total number of thoughts, expressed as a percentage.

Control Variables.

Individual differences. To account for relationships established in prior research, I used control variables. Need for cognition—the tendency for individuals to engage in and enjoy thinking (Cacioppo & Petty, 1982)—has been shown to influence the effectiveness

of counterfactual thinking (Petrocelli, Seta, & Seta, 2013) as well as reflection (Anseel et al., 2009) on task performance. Thus, I controlled for this variable using an 18-item scale (Cacioppo, Petty, & Kao, 1984). Consistent with prior research (Anseel et al., 2009), participants responded to these items using a 7-point anchored scale (1= extremely uncharacteristic of me and 7= extremely characteristic of me). Sample items include “I really enjoy a task that involves coming up with new solutions to problems” and “The notion of thinking abstractly is appealing to me.” The 18-item scale is included in Appendix D.

I also controlled for learning goal orientation—a mindset that motivates an individual to develop his or her competence by acquiring new skills or mastering new situations (Dweck, 1986; Dweck & Leggett, 2000). Anseel et al. (2009) demonstrated that written reflections are more effective for improving task performance when individuals have a high learning orientation. Similarly, Wong, Haselhuhn, & Kray (2012) have demonstrated that implicit beliefs—the beliefs that underlie learning goal orientation—influence the effects of counterfactual thinking. Based on these findings, I controlled for learning goal orientation using four items from VandeWalle, Cron, & Slocum's (2001) scale, measured on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Sample items include, “I truly enjoy learning for the sake of learning” and “I like classes that really force me to think hard.” The measurement items are presented in Appendix E.

Additionally, studies have demonstrated that conscientiousness, a Big Five (McCrae & Costa, 1987) personality trait that is exemplified by planning, organization,

persistence, and achievement, among other behaviors, influences learning and reflection processes (e.g. Bidjerano & Dai, 2007; Colquitt & Simmering, 1998; DeRue et al., 2012; Komarraju, Karau, Schmeck, & Avdic, 2011). Therefore, I controlled for conscientiousness using six items from the NEO Personality Inventory-Revised (NEO-PI-R) (Costa & McCrae, 1992). These items were measured on a 5-point scale (1 = strongly disagree to 5 = strongly agree) and are provided in Appendix F.

Demographic variables. Prior research has established that multiple demographic variables can impact learning processes (e.g. Cassara, 1990; Joy & Kolb, 2009; Maurer, 2001; Severiens & ten Dam, 1994). As a result, and consistent with DeRue et al. (2012) as well as DeRue & Wellman (2009), I controlled for international status (1 = born outside the U.S., 0 = born in the U.S.), as well as age and gender (0 = male, 1 = female). Additionally, I controlled for total amount of work experience, measured as number of months of full-time experience.

CHAPTER FOUR: RESULTS

In this chapter, I provide a comprehensive review of the data and the results for each analysis I conducted to validate the simulation and to test the hypotheses.

Accordingly, I have organized the details in this chapter in four sections. In the first section, I provide details pertaining to the simulation validation process, which includes the results from three expert rater evaluations as well as my pilot study. The second section includes an evaluation of the measurement model, followed by the results of the hypotheses testing. In the final section, I provide a summary of results, and I provide a detailed discussion of the findings subsequently in Chapter 5.

Simulation Validation: Rating Tasks and Pilot Study

Cloning Task.

Recall that I followed an established protocol by Lievens & Anseel (2009) when examining the effectiveness of the incident isomorphic cloning procedure. Five independent raters (40% female, 60% male) participated in the rating process. The raters had an average work experience of 20 years ($SD= 9.03$) and an average of 12 years ($SD= 7.87$) experience using behaviorally anchored rating scales or similar behavioral guidelines to rate individual performance. Sixty-percent of the raters had a masters or terminal degree.

To determine the degree to which the raters provided consistency in their ratings of the 261 cloned sets, I assessed inter-rater reliability with a two-way mixed, consistency, average measures intra-class correlation (ICC). This is an appropriate measure for fully crossed designs in which the researcher seeks to determine if the raters provided scores that are similar in rank order and when the average of the ratings is of focal interest (Hallgren, 2012; LeBreton & Senter, 2008; McGraw & Wong, 1996). Based on the assessment for the current rating task, the resulting ICC was in the excellent range, $ICC = .84$ (95% CI, .81 to .87), $p < .001$ (Cicchetti, 1994). The ICC demonstrated that the raters had a high level of agreement and rated the cloned items similarly (LeBreton & Senter, 2008).

The average similarity rating across all cloned items was 6.52 ($SD = .48$). The results indicated that the simulation contained six cloned interactions (three cloned negotiation interactions and three cloned management of personnel resources interactions). As such, the rating process provided preliminary results that the cloned interactions were suitable for use in the data collection process. Subsequently, I conducted a pilot study to confirm whether the two task rounds were comparable as viewed by non-expert participants, and I provide those details in a later section.

Participant Response Options Rating Tasks.

Time 1 participant response options. Five raters (60% female, 40% male) independently evaluated each set of response options presented in Time 1 interactions.

The raters had an average work experience of 21.8 years ($SD= 5.42$), an average of 6 years ($SD= 4.42$) experience using behaviorally anchored rating scales or similar behavioral guidelines to rate individuals' performance, and were scholars and industry professionals.

Participant response options were comprised of three levels of intended skill proficiency: low ($n= 280$), moderate ($n= 275$), and high ($n= 275$). Due to an error on the rater data-collection spreadsheet, there was one moderate- and one high-skill proficiency response option missing from the data. Nevertheless, given the high number of observations per cell and the limited amount of missing data, I determined that the missing values would not materially affect the results (Hair et al., 2010). There were no outliers, as assessed by boxplot, and the data were normally distributed, as assessed by histograms and values of skewness and kurtosis. However, Levene's test of homogeneity of variances indicated that homogeneity of variances was violated ($p = .046$). As such, Welch's F (Welch, 1951) and Games-Howell post hoc analyses were conducted to correct for this issue (Field, 2013; Hair et al., 2010)

Specifically, I conducted a one-way Welch ANOVA to determine whether the level of skill proficiency reflected in participant response options was different for each intended proficiency level. The mean expert rating for participant response options was statistically significantly different among the three intended skill proficiency groups Welch's $F(2, 549.24) = 550.40, p < .001$. The effect size, calculated using eta squared, was .56. The expert rating of skill proficiency reflected in participant response options

increased from low ($M = 2.19$, $SD = 1.17$) to the moderate ($M = 4.24$, $SD = 1.30$), and high ($M = 5.62$, $SD = 1.30$) intended skill proficiency groups, all in the intended direction.

Games-Howell post hoc analysis (see Table 11) revealed that the mean increase from low to moderate (2.05, 95% CI [1.80, 2.30]) was statistically significant ($p < .001$), as was the increase from moderate to high (1.39, 95% CI [1.13, 1.64], $p < .001$). The results indicate that Time 1 participant response options reflect the intended levels of skill proficiency.

Table 11

*Time 1 Participant Response Options: Intended Skill Proficiency Comparisons
Games-Howell Post-Hoc Analysis, Dependent Variable = Expert Rating*

(I) Intended Skill Proficiency	(J) Intended Skill Proficiency	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Moderate	-2.051*	.105	.000	-2.297	-1.804
	High	-3.436*	.105	.000	-3.683	-3.190
Moderate	Low	2.051*	.105	.000	1.804	2.297
	High	-1.385*	.111	.000	-1.645	-1.126
High	Low	3.436*	.106	.000	3.190	3.683
	Moderate	1.385*	.111	.000	1.126	1.645

* The mean difference is significant at the 0.05 level.

In addition to assessing the mean differences among the intended skill proficiency groups, I also assessed inter-rater reliability. Similar to the cloning rating task, I assessed inter-rater reliability with a two-way mixed, consistency, average measures intra-class

correlation (ICC). The results indicated that there was a high level of agreement and participant response options were rated similarly, as determined by an ICC result in the excellent range, $ICC = .88$ (95% CI, .84 to .90), $p < .001$ (Cicchetti, 1994).

Time 2 participant response options. Independent of Time 1 participant response option ratings, five raters evaluated the participant response options presented to participants in the Time 2 interactions. The raters had an average of 26.60 years ($SD = 12.06$) of work experience and 15.80 years ($SD = 7.83$) of experience using behaviorally anchored rating scales to evaluate performance. Similar to the Time 1 rater group, the raters for Time 2 participant response options were scholars and industry professionals.

Following the steps used to analyze the Time 1 participant response option ratings I conducted an initial examination of the data to detect outliers, to assess normality, and to assess homogeneity of variances. Levene's test of homogeneity of variances revealed borderline results ($p = .052$). As such, and for consistency with the approach used with the Time 1 ratings, I analyzed the expert ratings with a Welch ANOVA and a Games-Howell post hoc analysis.

I conducted a Welch ANOVA to determine whether the level of skill proficiency reflected in participant response options was different for each intended proficiency level. Again, the participant response options were comprised of three levels of intended skill proficiency, and there were no missing data in the Time 2 ratings, therefore: low ($n = 280$), moderate ($n = 280$), and high ($n = 280$).

The mean expert rating for participant response options was statistically significantly different among the three intended skill proficiency groups Welch's $F(2, 557.36) = 673.50, p < .001$. A large effect size, .61 was found (Cohen, 1988). The expert rating of skill proficiency reflected in participant response options increased as intended. Specifically, the ratings increased from low ($M = 2.20, SD = 1.08$) to moderate ($M = 4.27, SD = 1.16$), and high ($M = 5.67, SD = 1.16$).

The mean increases were statistically significant, as determined by a Games-Howell post hoc analysis. As illustrated in Table 12, the increase from low to moderate (2.07, 95% CI [1.85, 2.29]) was statistically significant ($p < .001$). Likewise, the increase from moderate to high was also statistically significant (1.38, 95% CI [1.15, 1.60], $p < .001$). The results indicate that Time 2 participant response options reflect the intended levels of skill proficiency.

Table 12

*Time 2 Participant Response Options: Intended Skill Proficiency Comparisons
Games-Howell Post-Hoc Analysis, Dependent Variable = Expert Rating*

(I) Intended Skill Proficiency	(J) Intended Skill Proficiency	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Moderate	-2.068*	.095	.000	-2.290	-1.846
	High	-3.443*	.095	.000	-3.666	-3.220
Moderate	Low	2.068*	.095	.000	1.846	2.290
	High	-1.375*	.099	.000	-1.606	-1.145
High	Low	3.443*	.095	.000	3.220	3.666
	Moderate	1.375*	.098	.000	1.145	1.606

* The mean difference is significant at the 0.05 level.

Additionally, the raters had a high level of agreement and rated the response options similarly. The results of a two-way mixed, consistency, average measures ICC was in the excellent range, ICC= .87 (95% CI, .64 to .99), $p < .001$ (Cicchetti, 1994). To review the overall results from the participant response options rating processes, I now provide a brief summary of the Time 1 and Time 2 participant results.

Participant response options rating summary. The aim of the participant response option rating task was to validate that the ranking of skill effectiveness for the decision points in the interactions represented the intended skill levels (i.e. low, moderate, and high). The results of the Time 1 and Time 2 rating tasks, reported above, indicate that the participant response options indeed reflected statistically significant differences among levels of skill proficiency. Additionally, the intended levels of skill proficiency aligned with expert rater judgments. For each rating task, there was a high level of agreement and consistent ratings across raters. Taken together, the results validate the level of skill proficiency reflected in participant response options in the simulation. I summarize the mean ratings for each proficiency group in Table 13.

Table 13

Expert Ratings: Participant Response Options, Mean Ratings of Intended Skill Proficiency Groups

Intended Skill Proficiency Level	Time 1 Participant Response Options	Time 2 Participant Response Options
Low	2.19 (<i>SD</i> = 1.17)	2.20 (<i>SD</i> = 1.08)
Moderate	4.24 (<i>SD</i> = 1.30)	4.27 (<i>SD</i> = 1.16)
High	5.62 (<i>SD</i> = 1.30)	5.67 (<i>SD</i> = 1.16)

Social Interactions Rating Task.

To assess the extent to which each social interaction captured its intended skill domain, thirty raters evaluated the content of each social interaction. The raters (63% female, 37% male) had an average of 24.53 years ($SD = 9.94$) of total work experience, 18.80 years ($SD = 9.94$) experience in a position that required negotiation skills, 15.03 years ($SD = 9.01$) experience in a position that required management of personnel resource skills, and 8.13 years ($SD = 7.10$) experience using behaviorally anchored rating scales to evaluate individuals' performance. The majority (83%) held, at least, a masters degree and 57% had doctoral level training.

Recall that I designed six interactions to assess participants' management of personnel resources skills and six to assess their negotiation skills. Thus, the raters evaluated the content of 12 interactions. For each interaction, a paired-samples t-test was used to determine whether there was a statistically significant mean difference between the interaction's rating on the extent to which it depicted a situation in which the manager displayed negotiation skills compared to the extent to which it depicted a situation in which the manager displayed management of personnel resources skills. This was an appropriate analysis to assess how a single target, in this case each interaction, rated in terms of responses to two different questions (Pallant, 2013). Prior to conducting each analysis, I inspected the data to ensure the basic assumptions of t-tests had been met, as well as the paired-samples t-test assumption of normal distribution of the difference

between the two scores for each interaction. I provide the results of each analysis below, and I have organized the interactions by intended skill domain.

Management of personnel resources interactions. The “Alex” interaction rated higher on management of personnel resources ($M = 3.87$, $SD = 1.11$) compared to negotiation ($M = 1.90$, $SD = 1.00$), a statistically significant mean increase of 1.97, 95% CI [1.32, 2.61], $t(29) = 6.22$, $p < .001$, $d = 1.14$. Thus, the interaction reflected the intended skill domain.

Likewise, the “Julie” interaction rated higher on management of personnel resources ($M = 4.43$, $SD = .67$) compared to negotiation ($M = 2.07$, $SD = 1.31$), a statistically significant mean increase of 2.67, 95% CI [1.82, 2.91], $t(29) = 8.80$, $p < .001$, $d = 1.61$. Again, a large effect was found (Cohen, 1988), and the interaction reflected the posited skill domain.

As posited, the “Chris” interaction rated higher on management of personnel resources ($M = 4.40$, $SD = .81$) compared to negotiation ($M = 2.30$, $SD = 1.26$), a statistically significant mean increase of 2.10, 95% CI [1.48, 2.72], $t(29) = 6.90$, $p < .001$, $d = 1.26$. Thus, the results indicate that the “Chris” interaction reflected the intended skill domain.

I also designed the “Michael” interaction to assess management of personnel resources skills. As intended, the interaction rated higher on management of personnel resources ($M = 4.40$, $SD = .72$) compared to negotiation ($M = 2.37$, $SD = 1.27$), a

statistically significant mean increase of 2.03, 95% CI [1.43, 2.64], $t(29) = 6.84$, $p < .001$, $d = 1.25$. Thus, the content of the interaction aligned with its intended skill domain.

The “Laura” interaction rated higher on management of personnel resources ($M = 4.50$, $SD = .82$) compared to negotiation ($M = 2.40$, $SD = 1.22$), a statistically significant mean increase of 1.86, 95% CI [1.40, 2.80], $t(29) = 6.17$, $p < .001$. The results indicated a large effect size, 1.13 (Cohen, 1988), and the interaction reflected the intended skill domain.

Lastly, the “Sam” interaction also rated higher on management of personnel resources ($M = 4.30$, $SD = .75$) compared to negotiation ($M = 1.36$, $SD = 1.10$), a statistically significant mean increase of 1.93, 95% CI [1.40, 2.51], $t(29) = 6.92$, $p < .001$. Again, I found a large effect size, 1.26 (Cohen, 1988) and determined that the interaction reflected the intended skill domain.

Negotiation interactions. I designed the “Joe” interaction to assess participants’ negotiation skills. As intended, the interaction rated higher on negotiation ($M = 4.13$, $SD = .86$) compared to management of personnel resources ($M = 1.93$, $SD = 1.08$), a statistically significant mean increase of 1.56, 95% CI [1.62, 2.79], $t(29) = 7.71$, $p < .001$, $d = 1.41$. Thus, the content of the interaction aligned with the posited skill domain.

Similarly, the “Kevin” interaction also captured the intended skill domain. Specifically, the interaction rated higher on negotiation ($M = 4.20$, $SD = 1.06$) compared to management of personnel resources ($M = 1.73$, $SD = 1.11$), a statistically significant

mean increase of 2.47, 95% CI [1.74, 3.20], $t(29) = 6.95$, $p < .001$. The results indicated a large effect size, $d = 1.27$ (Cohen, 1988).

I also designed the “Joyce” interaction to assess participants’ negotiation skills. The interaction rated higher on negotiation ($M = 4.70$, $SD = .47$) compared to management of personnel resources ($M = 2.00$, $SD = 1.05$), a statistically significant mean increase of 2.70, 95% CI [2.23, 3.17], $t(29) = 11.70$, $p < .001$, $d = 2.14$. Thus, the content of the interaction aligned with the posited skill domain.

Likewise, the “Ryan” interaction rated higher on negotiation ($M = 4.27$, $SD = .69$) compared to management of personnel resources ($M = 2.83$, $SD = 1.26$), a statistically significant mean increase of 1.43, 95% CI [.93, 1.94], $t(29) = 5.79$, $p < .001$, $d = 1.06$. Thus, the results indicated that the content of the interaction reflected the intended skill domain.

I designed the “John” interaction to reflect an interaction that would facilitate the assessment of participants’ negotiation skills. Contrary to my design intent, the interaction rated higher on management of personnel resources ($M = 3.40$, $SD = 1.32$) compared to negotiation ($M = 3.33$, $SD = 1.45$). However, the mean difference was not statistically significant, .67, 95% CI [-.85, .91], $t(29) = .15$, $p = .88$. Thus, the expert raters did not perceive the interaction as one that distinctly reflected the negotiation skill domain.

The “Dylan” interaction, the last negotiation interaction evaluated, was rated higher on negotiation ($M = 3.47$, $SD = 1.28$) compared to management of personnel

resources ($M = 3.10$, $SD = 1.21$). Nevertheless, the mean difference was not statistically significant, $.38$, 95% CI $[-.42, 1.16]$, $t(29) = .95$, $p = .35$. Thus, similar to its clone, the “John” interaction, the “Dylan” interaction did not distinctly reflect the negotiation skill domain.

Social interactions rating task summary. The social interactions rating task assessed the extent to which the posited skill domain reflected in each social interaction. The results indicated that all six management of personnel resources interactions successfully captured the intended skill domain, whereas four of the six negotiation interactions successfully captured the intended skill domain. Two interactions, the “John” and “Dylan” clones, did not distinctly reflect the intended skill, negotiation.

Recall that, in addition to the ratings discussed in the preceding sections, the expert raters also made a subjective decision as to which skill primarily reflected in the manager’s statements (i.e. the participant role in the simulation). The results were consistent with the findings above. The majority classification for each aligned with the intended skill domain, with the exception of two negotiation interactions. As such, I retained the six management of personnel resources interactions and advanced to the cloning effectiveness pilot study.

Cloning Effectiveness Pilot Study.

To assess whether mean performance on the two task rounds was comparable as viewed by non-expert participants, 62 participants completed both tasks (Time 1 and

Time 2 interactions) in a counterbalanced order. Initial inspection of the data revealed four cases with extreme scores more than two standard deviations below mean performance and completion times that suggested that the participants may have “clicked through” the simulation without weighing the various response options at each decision point. As such, I chose to remove those cases. Thus, the final sample included 58 usable responses for the two groups: normal ($n = 28$) and reversed ($n = 30$). The sample was 59% female, had a mean age of 20.67 years ($SD = 1.25$), and had a mean work experience of 2.23 years ($SD = 2.21$).

On average, participants completed the simulation in 40.05 minutes ($SD = 11.78$). The mean performance scores for the two task versions, presented to participants in a counterbalanced order, are reported in Table 14. I analyzed the performance data with a 2 (order: normal- vs. reversed-order) X 2 (task: Time 1 vs. Time 2) mixed ANOVA, with repeated measures on the last factor and performance as the dependent variable. Results showed neither an interaction effect between task and order, Wilks' Lambda = 1.00, $F(1, 56) = .005$, $p = .95$, nor a significant main effect of task, Wilks' Lambda = .97, $F(1, 56) = .208$, $p = .65$. The results indicated adequate alternate-form reliability at the level of task version and absence of practice or fatigue effects. As such, I determined that the simulation was ready for use in the hypothesis test study.

Table 14

*Pilot Study Mean Performance Scores, Order * Task Version*

Order	Task	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Normal	1	79.99	1.84	76.31	83.68
	2	79.67	1.71	76.25	83.10
Reversed	1	78.75	1.78	75.20	82.31
	2	78.32	1.65	75.10	81.63

Hypotheses Test Study Data Evaluation

Recall that I obtained 169 usable responses from my hypotheses test study sample. Upon collecting the data, I conducted an initial evaluation to identify outliers. Additionally, I conducted analyses to assess attrition bias, so I could determine whether the characteristics of the participants lost prior to launching the simulation, as well as those who failed to complete the simulation, differed significantly from those who completed the study in its entirety. The following sections outlines the results of these evaluation processes.

Outlier Identification.

To assess whether outliers were present, I conducted a Mahalanobis distance test D^2 , an appropriate outlier detection approach for multivariate analyses, which measures the distance of cases from the mean of the predictor variables (Field, 2013). I identified one outlier, participant #103, which reported above (3.41) the suggested threshold, $D^2/df > 2.5$ (Hair et al., 2010). Upon further examination, I determined that the outlier contained observations within the ordinary range of values on each variable. Because the

participant did not appear to be particularly high or low on any variables, rather just unique in combination, I chose to retain the case so as not to reduce the sample size further, nor to ignore a potentially valid element of the population (Hair et al., 2010).

Attrition Bias.

Due to the number of participants, 8 graduate- and 56 undergraduate students, who either elected to drop out or were unable to complete the simulation because of technical complications, it was important to assess whether those who dropped out were systematically different from those in the final sample. To this end, I conducted independent sample t-tests to assess differences in age, work experience, and supervisory experience between those in the final sample and those who did not complete the study in its entirety. While it was clear that some participants ($n = 34$) opted not to proceed to the simulation after completing the initial survey measures, recall that there was reason to believe that other participants, whose attrition occurred after launching the simulation ($n = 30$), may have failed to complete the study due to technical issues. As such, I conducted separate analyses to account for two types of attrition: 1) attrition prior to launching the simulation and 2) attrition after launching the simulation.

I reported the mean age for the final sample as well as the two attrition groups in Table 16. An independent-samples t-test revealed there was no significant difference in age between those in the final sample and those who dropped out during the simulation ($t = 1.87, p = .07$). In contrast, the difference in age between the final sample and that of

the second attrition group (i.e. attrition prior to launching the simulation) was significantly different ($t = 4.54, p < .001$). As reported in Table 15, the mean age of the final sample was higher.

Table 15

Attrition Bias Analysis for Age

	N	Mean	S.D.
Attrition during simulation	30	23.33	6.96
Attrition prior to launching simulation	34	21.91	3.33
Completed study and included in final sample	169	26.06	9.28
Total	233	25.10	8.51

Tables 16 and 17 provide the means and standard deviations for total work experience and for supervisory experience. The results of independent sample t-tests demonstrated that there was a significant difference in work experience for those in the final sample and those who terminated their participation during the simulation ($t = 2.04, p = .05$). Likewise, there was a significant difference in work experience for the final sample and those who failed to proceed to the simulation after completing the initial survey measures ($t = 4.12, p < .001$). For supervisory experience, the final sample was significantly different from the attrition during simulation group ($t = 1.93, p = .06$), as well as the attrition prior to launching simulation group ($t = 4.73, p < .001$).

The differences in age, work experience, and supervisory experience between those who dropped out and those who completed the study can likely be attributed to the higher number of graduate students in the final sample ($n = 58$) compared to those who dropped out ($n = 8$). Thus, while differences between attrition groups and final samples can be undesirable (Gravetter & Forzano, 2012), in this case, the older, more experienced individuals in the final sample were more closely aligned with my desired sample.

Table 16

Attrition Bias Analysis for Years of Work Experience

	N	Mean	S.D.
Attrition during simulation	30	4.96	4.86
Attrition prior to launching simulation	34	3.73	3.14
Completed study and included in final sample	169	7.20	8.47
Total	233	6.41	7.62

Table 17

Attrition Bias Analysis for Years of Supervisory Experience

	N	Mean	S.D.
Attrition during simulation	30	1.29	2.88
Attrition prior to launching simulation	34	.52	.85
Completed study and included in final sample	169	2.58	5.32
Total	233	2.11	4.71

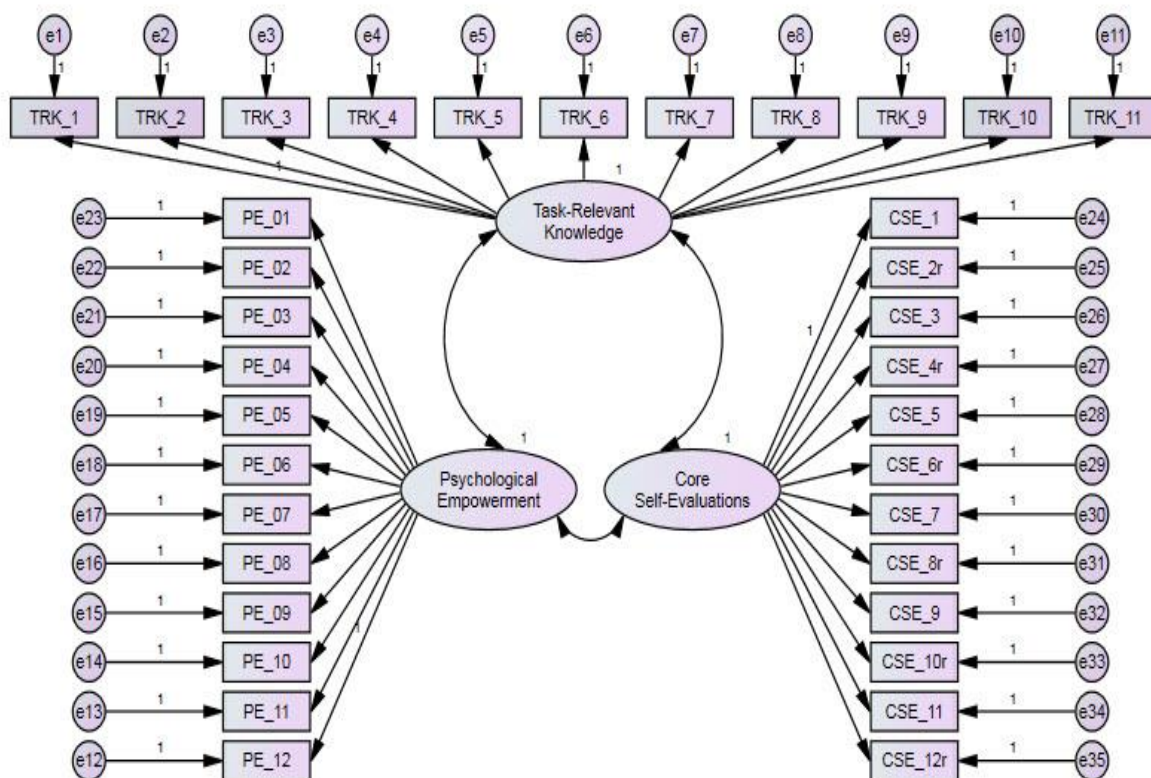
Confirmatory Factor Analysis

Prior to testing the hypotheses, I conducted a confirmatory factor analysis (CFA) to test measurement model validity. This examined the alignment among the data and the theoretical specification of factors (Hair et al., 2010). I performed the CFA using the IBM SPSS® AMOS™ version 22.0.0 software package. In the following sections, I report the steps I took to assess the initial measurement model as well as to improve model fit. Subsequently, I report the details of the final measurement model, as well as construct reliability and convergent and discriminant validity.

Initial Measurement Model.

Recall from Chapter 3, my study includes two latent constructs, two direct measures calculated by the simulation software, two direct measures from coding processes, and one experimentally manipulated categorical variable. Because confirmatory factor analysis assesses the extent to which measured variables represent latent constructs, only the three latent constructs in my research model were included in the CFA (Hair et al., 2010), namely psychological empowerment, task-relevant knowledge, and core self-evaluations. Each construct exceeded recommendations for a minimum of three to four indicators (Byrne, 2013; Hair et al., 2010). Specifically, each consisted of multiple indicators, including 12 for psychological empowerment, 11 for task-relevant knowledge, and 12 for core self-evaluations. To illustrate, an image of the initial measurement model is provided in Figure 7, Initial Measurement Model.

Figure 7

Initial Measurement Model

After I specified and, subsequently, estimated the measurement model, I reviewed multiple indices to determine the acceptability of the model fit. As recommended, I assessed X^2 (1552.51), as well as a minimum of two other fit indices and the corresponding thresholds (Hair et al., 2010), which are summarized in Table 18, Initial Measurement Model Fit Results. As reported, modifications were needed to improve model fit. Therefore, I proceeded to a multi-step process to refine the model, which I describe in the following section.

Table 18

Initial Measurement Model Fit Results

Fit Index	Desired	Actual
Chi-square/Degrees of Freedom (CMIN/DF)	Below 2 is preferred; 2-5 is acceptable	2.772
Comparative Fit Index (CFI)	>.92	.699
Root Mean Square error of Approximation (RMSEA)	<.08	.103

Note: The desired values are based on a model with 35 observed variables and $N < 250$ (Hair et al., 2010). Current model: $N = 169$

Model Refinement.

To refine the measurement model, it was necessary to identify and remove problematic indicators. Therefore, I followed established protocol to identify those with low validity, low reliability, strong and significant measurement error covariances, or non-hypothesized cross-loadings (Hair et al., 2010; MacKenzie, Podsakoff, & Podsakoff, 2011, p. 316). To this end, I examined the statistical significance of each loading, as well as the standardized loadings; those with values less than .50 were noted for potential removal. I also reviewed the modification indices to identify significant measurement error covariances with high expected change estimates.

Using this approach, I removed nine items from the model, and I conducted the model evaluation steps in an iterative process following each removal. Two indicators associated with question numbers 3 and 9 of the core self-evaluation scale (see Appendix

C) were removed due to low factor loadings, .48 and .45 respectively. I removed the indicators associated with question numbers 9 and 11 of the task-relevant knowledge scale (see Appendix G) due to measurement error covariances with high modification indices (e.g. 29.99). Likewise, I removed five indicators from the psychological empowerment. The indicators, which were associated with question numbers 1, 3, 9, 11, 12 on the psychological empowerment scale (see Appendix I) which had measurement error covariances and had high modification indices (e.g. 81.29, 27.82).

These changes improved X^2 (589.41), as well as other indices, as shown in Table 19. Although the final model does not pass the $>.92$ CFI threshold, the removal of additional indicators in the pursuit of improving fit would likely come at the expense of testing a true model based on theory and would far exceed the recommended limits for indicator removal (Hair et al., 2010). For these reasons, along with an acceptable CMIN/DF, as well as an acceptable RMSEA which can be used to reject the null hypothesis of poor fit (Coehlin, 2004), I chose not to remove additional indicators.

Table 19

Model Refinement Results

Fit Index	Desired	Initial Model	Final Model
CMIN/DF	Below 2 is preferred; 2-5 is acceptable	2.772	1.971
CFI	$>.92$.699	.852
RMSEA	$<.08$.103	.076

Note: $N = 169$

Construct Validity and Reliability.

Once I refined the measurement model, I evaluated construct validity and reliability. To this end, I examined the convergent, discriminant, and nomological validity as well as the internal consistency of the observed indicator variables. The evaluations, described below, indicated that the constructs met the recommended thresholds for both validity and reliability.

Convergent validity. To assess convergent validity, I examined the standardized regression weights (factor loadings), variance extracted (AVE), and reliability. As shown in Table 21, all factor loadings meet the recommended minimum of .5 and many exceed the preferred .7 threshold. Moreover, the variance extracted exceeds 50 percent, and construct reliabilities surpass the minimum threshold of .7, thereby suggesting adequate reliability. Taken together, the findings reported in Table 20 support the convergent validity of the measurement model (Hair et al., 2010).

Table 20

Standardized Regression Weights, AVE, and Reliability Estimates

		PE	TRK	CSE
PE	PE ₂	.72		
PE	PE ₄	.91		
PE	PE ₅	.93		
PE	PE ₆	.74		
PE	PE ₇	.64		
PE	PE ₈	.59		
PE	PE ₁₀	.75		
TRK	TRK ₁		.83	
TRK	TRK ₂		.75	
TRK	TRK ₃		.68	
TRK	TRK ₄		.71	
TRK	TRK ₅		.67	

		PE	TRK	CSE
TRK	TRK ₆		.84	
TRK	TRK ₇		.78	
TRK	TRK ₈		.83	
TRK	TRK ₁₀		.79	
CSE	CSE ₁			.80
CSE	CSE ₂			.74
CSE	CSE ₄			.85
CSE	CSE ₅			.53
CSE	CSE ₆			.55
CSE	CSE ₇			.78
CSE	CSE ₈			.86
CSE	CSE ₁₀			.70
CSE	CSE ₁₁			.62
CSE	CSE ₁₂			.88
	AVE	58.21%	59.86%	54.62%
	Construct Reliability	.91	.93	.92

Note: PE = Psychological Empowerment; TRK = Task-Relevant Knowledge; CSE = Core Self-Evaluations; *N* = 169

Discriminant validity. To assess the extent to which each construct was distinct from the other constructs, I compared the AVE of each construct with the corresponding squared interconstruct correlations to ensure that the AVE was higher. I reported the findings in Table 22. As illustrated, the results indicated that the AVEs indeed exceed the squared interconstruct correlation estimates and, thus, support the discriminant validity of the constructs.

Nomological validity. To assess nomological validity, I examined the correlations between the constructs in the measurement model. As shown in Table 21, the constructs are positively related. Prior empirical research and theory suggest that core self-evaluations are positively related to psychological empowerment and task-relevant knowledge, and task-relevant knowledge can influence psychological empowerment (e.g.

Bandura, 1989; Seibert et al., 2011). Therefore, the analysis of correlations among the constructs, which are both positive and significant, support the nomological validity of the model.

Table 21

Construct Correlation Matrix

	Psychological Empowerment	Task-Relevant Knowledge	Core Self-Evaluations
Psychological Empowerment	1.00	.37	.37
Task-Relevant Knowledge	.61***	1.00	.18
Core Self-Evaluations	.61***	.42***	1.00
AVE	58.21%	59.86%	54.62%

Significance Level: * = .05, ** = .10, *** = .001

Note: Values below the diagonal are correlation estimates among constructs; values above the diagonal are squared correlations. $N = 169$

Descriptive Statistics and Manipulations

Descriptive Statistics.

Descriptive statistics and correlations among variables are reported in Table 22.

As can be seen, baseline performance discrepancy and Time 2 performance was significantly correlated ($r = -.91, p < .01$). Age ($r = -.34, p < .01$), education ($r = -.38, p < .01$), work experience ($r = -.26, p < .01$), and supervisory experience ($r = -.28, p < .01$) were all significantly correlated to baseline performance discrepancy, with more experienced and higher educated participants having lower performance discrepancy, thus providing additional support for the validity of the simulation. As shown, similar correlations between these variables and Time 2 performance were also found.

Table 22
Descriptive Statistics, Inter-correlations, and Reliability

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	
1	Baseline Perf. Discrepancy	22.47	11.57	--												
2	Time 2 Performance	77.16	11.07	-.91**	--											
3	Self-Focused Upward CFT ^a	27.50	36.33	.12	-.14	--										
4	Task-Relevant Knowledge	5.62	.90	-.15	.17*	.06	.92									
5	Psychological Empowerment	5.61	.73	-.19*	.19*	.03	.44**	.84								
6	Feedback Specificity ^b	--	--	.001	.03	.05	.04	.03	--							
7	CFT Specificity ^c	32.30	41.40	-.04	.05	.15*	.12	.02	-.03	--						
8	Core Self-Evaluations	4.05	.67	-.12	.14	.14	.20**	.28**	-.12	.12	.84					
9	Work Experience ^d	87.03	101.75	-.26**	.27**	.04	.15	.23**	-.08	.09	.19*	--				
10	Supervisory Experience ^e	31.15	63.80	-.28**	.27**	.06	.19*	.22**	-.11	.08	.14	.83*	--			
11	Age	26.06	9.28	-.34**	.35**	-.02	.20**	.20**	-.11	.07	.21**	.91**	.70**	--		
12	Education ^f	--	--	-.38**	.41**	-.08	.19*	.14	-.05	.02	.23*	.60**	.45**	.73**	--	
13	Gender ^g	--	--	-.21**	.24	.04	.09	.07	.05	.02	.07	.11	.02	.09	.08	--

Note: $N = 169$; Cronbach's alpha coefficients when appropriate are shown on the diagonal; ** $p < 0.01$ (2-tailed); * $p < 0.05$ (2-tailed).

^a Percentage of self-focused upward counterfactual thoughts out of total thoughts recorded in reflection

^b Coded 0 = Low, 1 = High feedback specificity

^c Percentage of specific counterfactuals out of total counterfactual thoughts recorded in reflection

^d Work experience was measured in months.

^e Supervisory experience was measured in months.

^f Coded 0 = Undergraduate student, 1 = Graduate student

^g Coded 0 = Male 1 = Female

Additionally, psychological empowerment was significantly correlated to lower baseline performance discrepancy ($r = -.19, p < .05$), and both psychological empowerment ($r = .19, p < .05$) and task-relevant knowledge ($r = .17, p < .05$) were significantly correlated with Time 2 performance, demonstrating that those who felt more empowered and reported higher levels of task-relevant knowledge performed somewhat better on the simulation tasks.

Manipulations.

Recall that my study included manipulations of feedback specificity and psychological empowerment antecedents. Prior to testing the hypotheses, I evaluated the effectiveness of the manipulations by analyzing participants' responses to the 2-item perceived feedback specificity manipulation check (see Appendix H), as well as the mean ratings on the psychological empowerment scale (see Appendix I). I provide the results in the following sections.

Feedback specificity. The feedback specificity manipulations included three specificity levels: low ($n = 58$), moderate ($n = 55$), and high ($n = 56$). When I assessed perceptions of feedback specificity among the three groups, Levene's test of homogeneity of variances indicated that homogeneity of variances was violated ($p = .001$). Consequently, I conducted a one-way Welch ANOVA to determine whether the mean ratings of perceived feedback specificity differed significantly for each level of feedback specificity. Results demonstrated that the mean rating of perceived feedback specificity

was statistically significantly different among the three groups, Welch's $F(2, 166) = 10.94, p < .001$, with a medium to large effect size, $.13$ (Cohen, 1988).

Despite reaching statistical significance, the actual difference in mean scores between the groups indicated that, for some groups, participants' perceptions of feedback specificity were not aligned with the intended levels of feedback specificity. More precisely, post-hoc comparisons using the Games-Howell test, which corrects for the homogeneity of variances violation, indicated that the mean score for the low feedback specificity condition ($M = 4.96, SD = 1.40$) did not differ significantly from the moderate feedback specificity group ($M = 5.29, SD = 1.10$). However, the mean difference between the low and high conditions ($-.98, 95\% \text{ CI } [-1.49, -.47]$) was significantly different ($p < .001$), as was the difference between moderate and high ($-.65, 95\% \text{ CI } [-1.09, -.20]$), $p < .001$). On the basis of these findings, to conduct subsequent analyses I combined the low and moderate groups such that the final feedback specificity variable included two conditions (i.e. low and high).

Psychological empowerment. To assess whether manipulations of psychological empowerment antecedents were effective for influencing the extent to which participants felt empowered, I conducted an independent-samples t-test to compare psychological empowerment scores for participants in the low ($n = 93$) and high ($n = 76$) conditions. There was no significant difference in scores for those in the low psychological empowerment group ($M = 5.67, SD = .66$) and those in the high group ($M = 5.54, SD = .81$). The magnitude of the mean difference ($.13, 95\% \text{ CI } [-.10, .35]$) was very small

(Cohen, 1988), $d = .18$, and not in the intended direction. I note this finding as a limitation and discuss it in more detail in Chapter 5.

Data Analysis

To test hypothesis 1, I conducted a hierarchical regression analysis using IBM® SPSS® 23.0.0 software. I used a two-step process. First, I entered the control variables in Model 1, followed by the independent variable, baseline performance discrepancy, in Model 2.

All subsequent hypotheses were tested with the PROCESS macro—a computational tool for SPSS, developed by Preacher and Hayes (Preacher & Hayes, 2004) to help researchers overcome analytical challenges associated with mediation, moderation, and conditional process analyses (Hayes, 2012). This tool uses a path analysis framework to estimate coefficients in ordinary least squares (OLS) regression models and can generate direct, indirect, and conditional indirect effects in moderated mediation models (Hayes, 2012, 2013).

For each proposed boundary condition in the relationship between baseline performance discrepancy and self-focused upward counterfactual thinking (H1 – H4), I utilized PROCESS Model 1, as there was not an ideal PROCESS model to test all moderators simultaneously. Using the PROCESS options available, I requested the mean center for all products.

Next, I examined the relationship between self-focused upward counterfactual thinking and performance with the proposed boundary conditions. I utilized PROCESS Model 2 to test these relationships, as it accommodated all variables simultaneously. Again, I requested the mean center for the products.

Then, I utilized PROCESS Model 4 to examine whether simple mediation was present, as proposed in Hypotheses 5b. Finally, I addressed the moderated mediation hypotheses (H8a – H8e). The results of the hypotheses testing are provided in the following section.

Hypotheses Testing

Hypothesis 1 proposed a positive relationship between baseline performance discrepancy and self-focused upward counterfactual thinking. After controlling for the variables in Model 1, baseline performance discrepancy Model 2 of Table 23, the standardized coefficient ($\beta = .17, p = .045$) was significant. Therefore, hypothesis 1 was supported. As baseline performance discrepancy increased, participants engaged in more self-focused upward counterfactual thinking.

Table 23

Results of Regression Analysis for Self-Focused Upward Counterfactual Thinking

Variables	Self-Focused Upward Counterfactual Thinking			
	Model 1 ^a		Model 2 ^a	
	β	S.E.	β	S.E.
Learning Goal Orientation	-.07	(3.12)	-.08	(3.09)
Need for Cognition	.05	(4.98)	.10	(5.08)
Conscientiousness	.07	(4.89)	1.00	(4.90)
Total Work Experience	.06	(.03)	.08	(.03)

International Status	-.16*	(8.99)	-.15*	(8.90)
Baseline Performance Discrepancy			.17*	(.26)
Adjusted R ²	.004		.023	
ΔR^2	.034		.024	
Sig. F Change	.337		.045*	

^a Standardized betas (β) with standard errors (S.E.) are reported.

Note: $N = 169$; * $p \leq .05$.

Hypothesis 2 proposed that task-relevant knowledge moderates the influence of baseline performance discrepancy on self-focused upward counterfactual thinking, such that the influence becomes more positive as task-relevant knowledge increases. Using the bootstrap method, moderation is deemed significant if the 95% bias-corrected confidence intervals for the interaction terms do not include zero—the equivalent of a significance value of $p < .05$ (Hayes, 2013). As shown in Table 24, the confidence intervals for the interaction term, BPD * TRK, include zero, $b = .56$, 95% CI [-.10, 1.23], $t = 1.68$, $p = .09$. Thus, hypothesis 2 was not supported.

Table 24

Results of Moderated Regression for Self-Focused Upward Counterfactual Thinking

Predictor	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LL 95% CI	UL 95% CI
Constant	-7.03	28.31	-.25	.80	-62.94	48.87
Baseline Perf. Discrepancy (BPD)	.63	.28	2.24	.03	.07	1.19
Task-Relevant Knowledge (TRK)	2.48	3.25	.76	.45	-3.95	8.90
BPD * TRK	.56	.34	1.68	.09	-.10	1.23
Controls:						
Learning Goal Orientation	-2.93	3.18	-.92	.36	-9.22	3.36
Conscientiousness	5.11	4.77	1.07	.29	-4.30	14.52
Need for Cognition	6.25	5.02	1.25	.21	-3.66	16.15
Work Experience	.04	.03	1.15	.25	-.03	.10

Predictor	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LL 95% CI	UL 95% CI
International Status	-19.43	6.67	-2.91	.00	-32.60	-6.26

Note: $n = 169$; Dependent variable = self-focused upward counterfactual thinking; Unstandardized regression coefficients are reported. Bootstrap sample size = 1,000; LL = lower limit; CI = confidence interval; UL = upper limit

Hypothesis 3 proposed that psychological empowerment moderates the influence of baseline performance discrepancy on self-focused upward counterfactual thinking, such that the influence of baseline performance discrepancy becomes more positive as psychological empowerment knowledge increases. As shown in Table 25, the confidence intervals for the interaction term, BPD * PE, include zero, $b = .61$, 95% CI [-.17, 1.40], $t = 1.54$, $p = .12$. Thus, hypothesis 3 was not supported.

Table 25

Results of Moderated Regression for Self-Focused Upward Counterfactual Thinking

Predictor	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LL 95% CI	UL 95% CI
Constant	-7.60	28.53	-.27	.79	-63.95	48.74
Baseline Perf. Discrepancy (BPD)	.54	.29	1.84	.07	-.04	1.11
Psychological Empowerment (PE)	.06	4.00	.01	.99	-7.84	7.96
BPD * PE	.61	.40	1.54	.12	-.17	1.40
Controls:						
Learning Goal Orientation	-.2.76	3.09	-.89	.37	-8.87	3.34
Conscientiousness	5.66	4.78	1.18	.24	-3.78	15.09
Need for Cognition	5.68	4.94	1.15	.25	-4.07	15.43
Work Experience	.04	.03	1.10	.27	-.03	.10
International Status	-17.85	6.46	-2.76	.01	-30.60	-5.09

Note: $n = 169$; Dependent variable = self-focused upward counterfactual thinking; Unstandardized regression coefficients are reported. Bootstrap sample size = 1,000; LL = lower limit; CI = confidence interval; UL = upper limit

Hypothesis 4 proposed that feedback specificity moderates the influence of baseline performance discrepancy on self-focused upward counterfactual thinking, such that the influence of baseline performance discrepancy becomes weaker as feedback

specificity increases. As shown in Table 26, hypothesis 4 was not supported, $b = -.07$, 95% CI [-1.25, 1.12], $t = -.11$, $p = .91$.

Table 26

Results of Moderated Regression for Self-Focused Upward Counterfactual Thinking

Predictor	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LL 95% CI	UL 95% CI
Constant	-6.54	27.25	-.24	.81	-60.34	47.27
Baseline Perf. Discrepancy (BPD)	.52	.28	1.83	.07	-.04	1.08
Feedback Specificity (FBS)	4.04	6.41	.63	.53	-8.62	16.69
BPD * FBS	-.07	.60	-.11	.91	-1.25	1.12
Controls:						
Learning Goal Orientation	-2.35	3.15	-.75	.46	-8.57	3.87
Conscientiousness	5.85	4.66	1.25	.21	-3.37	15.06
Need for Cognition	4.76	4.88	.98	.33	-4.87	14.39
Work Experience	..03	.03	.89	.38	-.04	.10
International Status	-18.14	6.83	-2.66	.01	-31.63	-4.65

Note: $n = 169$; Dependent variable = self-focused upward counterfactual thinking; Unstandardized regression coefficients are reported. Bootstrap sample size = 1,000; LL = lower limit; CI = confidence interval; UL = upper limit

Together, hypotheses 5a, 6, and 7 proposed that self-focused upward counterfactual thinking will positively relate to performance and the relationship will become stronger as core self-evaluations (H6) and counterfactual content specificity (H7) increase. These were tested simultaneously using PROCESS Model 2. The effect of self-focused upward counterfactual thinking on performance included zero in the lower and upper confidence interval limits ($b = -.22$, 95% CI [-1.44, 1.00], $t = .36$, $p = .72$). Likewise, the confidence interval for the interaction term for self-focused upward counterfactual thinking and core self-evaluations included zero $b = -.22$, 95% CI [-1.44, 1.00], $t = .36$, $p = .72$, as did the interaction term for self-focused upward counterfactual

thinking and counterfactual content specificity, $b = -.22$, 95% CI [-1.44, 1.00], $t = .36$, $p = .72$. Therefore, hypotheses 5a, 6, and 7 were not supported.

Hypothesis 5b proposed that baseline performance discrepancy indirectly affects performance, through self-focused upward counterfactual thinking. The effect of baseline performance discrepancy on performance in isolation (the total effect) was significant, as indicated by a significant unstandardized regression coefficient ($b = -.86$, 95% CI [-.92, -.79], $t = -25.43$, $p < .01$). When self-focused upward counterfactual thinking is introduced as well (the direct effect), the total effect changed minimally, ($b = -.85$, 95% CI [-.92, -.78], $t = -25.28$, $p < .01$). Based on bootstrap confidence intervals, mediation is present if the 95% bias-corrected indirect effect confidence intervals do not include zero. This is the equivalent of a significance value of $p < .05$ (Hayes, 2013). In this case, the indirect effect of baseline performance discrepancy on performance through self-focused upward counterfactual thinking was negative (-.01) and the confidence interval included zero (95% CI [-.02, .01]). Therefore, hypothesis 5b was not supported.

Regarding the proposed conditional indirect effects (Hypotheses 8a – 8e), the preceding results indicated that neither the indirect effect nor the proposed boundary conditions on the direct paths in the research model were significant. Likewise, the conditional indirect effect hypotheses (H8a – H8e) were not supported.

In summary, the results of the hypotheses testing indicated that hypothesis 1, the relationship between baseline performance discrepancy was supported. The remaining hypotheses were not supported.

CHAPTER FIVE: DISCUSSION, LIMITATIONS, AND FUTURE RESEARCH

In this study, I integrated established theory from the psychology field—the functional theory of counterfactual thinking (Epstude & Roese, 2008)—to investigate how counterfactual thinking influences feedback processing and subsequent performance. To this end, I examined whether a performance discrepancy, conveyed to individuals through feedback, indirectly effects subsequent performance through self-focused upward counterfactual thinking. In addition, I analyzed boundary conditions of such thinking and its effects on performance. To examine these relationships, I designed, developed, validated, and implemented a leadership skill social interaction simulation. I tested the conceptual model using data from a sample of 169 graduate and undergraduate students. I validated the research model with a CFA and, subsequently, tested the hypotheses with hierarchical regression analysis and the PROCESS macro for SPSS. In this chapter, I discuss the findings, implications, and limitations of my research, as well as directions for future research.

Discussion of Findings

My research represents a step towards theoretically integrating counterfactual thinking theory with reflection in the management literature to explain how individuals process and learn from feedback that conveys performance discrepancies. Over the last decade, scholars have promoted reflection as a way to enhance learning from feedback

and experiences (e.g. Ellis et al., 2014). However, prior research has not investigated the unique contribution of counterfactual thinking to learning and performance improvement. In this study, I sought to address this and to investigate whether counterfactual thinking can enhance the effectiveness of performance discrepancy feedback on performance.

Baseline Performance Discrepancy, Self-Focused Upward Counterfactual Thinking, and Proposed Boundary Conditions.

As predicted, my research suggests that when individuals reflect on performance discrepancies, they will likely engage in self-focused upward counterfactual thinking. In doing so, they question how they could have altered their behaviors to attain better outcomes. The results, therefore, demonstrate that individuals may attempt to reconcile performance discrepancies through self-focused upward counterfactual thoughts. Thus, this finding may be an important step towards understanding how to assist individuals with processing performance discrepancy feedback and to increase the effectiveness of such feedback.

Task-relevant knowledge. The question remains as to what conditions support and hinder self-focused upward counterfactual thinking. I expected that task-relevant knowledge would moderate the effect of baseline performance discrepancy on self-focused upward counterfactual thinking, such that task-relevant knowledge would strengthen the relationship. However, my results did not support this hypothesis. This finding can be interpreted in three ways: 1) task-relevant knowledge plays no role in influencing self-focused upward thoughts, 2) it plays a conditional role in the

relationship, or 3) the self-report measure of task-relevant knowledge did not capture accurately participants' task knowledge.

Task-relevant knowledge can lead to higher levels of self-efficacy, to help individuals direct efforts toward goals, and to select behavioral responses from among multiple possibilities (Bandura, 1986). Therefore, while it may be possible that task-relevant knowledge plays no role in influencing self-focused upward counterfactual thoughts, theory suggests otherwise. As such, it seems more likely that task-relevant knowledge may play a conditional role, rather than no role, in influencing counterfactual thoughts. According to Kinciki et al. (2004), the extent to which an individual perceives feedback as an accurate representation of his or her performance, predicts whether he or she has a desire to respond (i.e. whether an individual wants to respond in line with the feedback). Therefore, in the current study, the extent to which individuals perceived their performance discrepancies as accurate may have influenced their desire to scan their repertoire of knowledge in the pursuit of identifying behavioral alternatives, from which they could generate self-focused upward counterfactuals.

It is also possible that the lack of support for task-relevant knowledge as a boundary condition is an artifact of the self-report measurement. Participants may have selected those responses that were more socially desirable or more ego flattering than other responses, thereby compressing scores at the high end of the scale and restricting variance (Podsakoff & Organ, 1986). To this point, 61% of participants rated their task-relevant knowledge as greater than or equal to 6 out of 7. Because task-relevant

knowledge is comprised of facts and knowledge structures that are necessary for successful task performance (Costanza et al., 1999, p. 71), one would expect to find a significant negative correlation between task-relevant knowledge and baseline performance discrepancy. Surprisingly, I did not find such in this study.

However, recall from Chapter 3 that job experience contributes to the acquisition of task-relevant knowledge (Schmidt et al., 1986), and prior research has included job experience measures when operationalizing task-relevant knowledge (e.g. Ahearne, Mathieu, & Rapp, 2005). Following this practice, I collected supervisory experience as a supplemental indicator of task-relevant knowledge. Interestingly, when I tested the proposed relationship with supervisory experience as the indicator of task-relevant knowledge, I found support for hypothesis 2 ($\beta = .01, p < .05$). Likewise, I found a significant negative correlation between supervisory experience and baseline performance discrepancy ($r = -.28, p < .01$).

These findings suggest that either participants did not assess accurately their task-relevant knowledge or the accumulation of task-relevant knowledge through experience (Costanza, 1999) offers a unique contribution to self-focused upward counterfactual thinking. Perhaps supervisory experience provides individuals with opportunities to organize related facts and information about the skill domain in ways that are more meaningful and, thus, increases the influence of knowledge structures on counterfactual reflection.

Psychological empowerment. Contrary to my prediction, psychological empowerment did not moderate the relationship between baseline performance discrepancy and self-focused upward counterfactual thinking. Prior research has established a theoretical and empirical connection between social power and self-focused counterfactuals (Scholl & Sassenberg, 2014). As such, the extent to which one *actually* has the ability to control one's own and other's outcomes (i.e. social power) may make psychological empowerment less relevant. In the current study, participants' ability to control outcomes was restricted to three predetermined choices. Therefore, although they served in the manager role, the extent to which they could actually control their course of action was somewhat restricted. Consequently, they may have had lower levels of social power, which would have attenuated self-focused counterfactuals. Additionally and as previously noted, the manipulations of psychological empowerment antecedents did not generate distinct conditions of low and high psychological empowerment. Consequently, the variance was limited, with the vast majority (92%) of participants reporting psychological empowerment scores greater than or equal to 5 out of 7.

The empowerment literature offers potential explanations as to why the conditions were difficult to manipulate. Specifically, in contrast to structural empowerment, psychological empowerment comes from within an individual, not from external programs or processes (Spreitzer & Quinn, 2008; Spreitzer, 2008). Although forms of structural empowerment, such as those manipulated in this study, are antecedents to psychological empowerment, a number of individual differences (e.g. locus of control,

self-consciousness) also influence psychological empowerment (Seibert et al., 2011). It is possible that, for some participants, these factors influenced their sense of empowerment more than the manipulations. In the current study, I did not capture those individual differences and, thus, I cannot ascertain how many psychological empowerment scores may have been impacted by such differences.

Another possible explanation for the ineffective manipulations lies in the research setting and, consistent with job characteristics theory (Hackman & Oldham, 1980), the design of the work itself (i.e. the simulation) may have promoted psychological empowerment. According to job characteristics theory, five core job characteristics (skill variety, task significance, task identify, autonomy, and feedback) influence critical psychological states that, in turn, affect motivational outcomes (e.g. empowerment). Before measuring psychological empowerment, each interaction was unique in terms of its situation and the challenge it posed for the participant. As such, it offered skill variety. Similarly, in each interaction, participants' actions affected others (subordinates), and each interaction had a clear outcome. Thus, participants may have perceived task significance, as well as task identity. With the freedom to complete the simulation from a location of their preference, along with their roles as managers in the simulation, participants may have had a high level of autonomy. Finally, with the feedback provided by the simulated characters during the interactions, as well as the feedback provided at the end of Time 1 tasks, participants may have had sufficient knowledge of their results.

If true, then these design properties of the simulation may have promoted psychological empowerment, thus contributing to the high scores on this construct.

On a related note, scholars contend that immersive learning experiences and interactivity in virtual worlds can enhance engagement and empowerment (de Freitas, Rebolledo-Mendez, Liarokapis, Magoulas, & Poulouvassilis, 2010). As such, it is possible that the use of a virtual workplace setting affected how participants experienced empowerment in the study. To this point, participants may have had difficulty differentiating their sense of empowerment as a *participant* in a virtual simulation from their sense of empowerment as a *manager* in the virtual organization.

Feedback specificity. I also examined whether feedback specificity influences the extent to which individuals engage in self-focused upward counterfactual thinking. I argued that high feedback specificity might limit the extent to which individuals explore alternative versions of their behaviors and associated performance outcomes. Following this line of thought, I hypothesized (hypothesis 4) that as feedback specificity increases, the relationship between baseline performance discrepancy and self-focused upward counterfactual thinking would weaken. However, I did not find support for this relationship and, interestingly, there were no significant mean differences between the low- and high feedback specificity groups on self-upward counterfactual thinking, reflection word count, nor reflection time.

To these points, recall that the feedback specificity manipulations did not yield low-, moderate-, and high feedback specificity groups and, consequently, I conducted the

analysis with low and high conditions only. As such, the variance of this construct was somewhat limited. The feedback messages, including the specificity level of each, were similar to those used successfully in prior studies (e.g. Feys et al., 2011). Thus, it was interesting that the distinctions among the feedback specificity levels were less clear in the current study, which is important to consider when interpreting the results of hypothesis 4. Perhaps, rather than focusing on the specificity level of the text-based performance feedback, which was the focus of the manipulation check and the measurement of the construct, it is possible that participants in the current study also considered the specificity level of the feedback provided by the simulated characters during the interactions. As such, participants may have considered nonverbal feedback such as the simulated characters' facial expressions, as well as other body language, when responding to the feedback specificity manipulation check and when considering the specificity level while reflecting. Such issues could have affected the results of hypothesis 4.

The lack of support for this hypothesis and the lack of mean differences between the low and high feedback specificity groups on reflection word count and reflection time are intriguing, particularly when viewed in the context of Goodman et al.'s (2011) findings. Their study demonstrated that low feedback specificity led to higher levels of explicit information processing. In the current study, feedback specificity had no significant effects. A possible explanation for this may be that, whereas Goodman et al.'s (2011) study captured information processing via a verbal protocol method, the current

study engaged participants in a written reflection activity. Future studies should utilize a verbal reflection protocol to examine the effect of feedback specificity on self-focused upward counterfactual thinking.

The Effect of Self-Focused Upward Counterfactual Thinking on Performance, Proposed Boundary Conditions, and Indirect Effects.

According to the functional theory of counterfactual thinking (Epstude & Roese, 2008), counterfactual thinking involves the transfer of information from a causal inference and/or the activation of information processing that enhances motivation and effort expenditure and, consequently, fuels behavior change. As such, I argued that self-focused upward counterfactual thinking would positively influence performance (hypothesis 5a). Surprisingly, and contrary to theory as well as prior research in the psychology literature (e.g. Epstude & Roese, 2008), I did not find this effect in my study.

Whereas most counterfactual thinking studies in the psychology literature have measured the effect of counterfactuals on anagram task performance or academic-related tasks such as test performance (e.g. Markman et al., 1993; Nasco & Marsh, 1999; Roese, 1994), my study examined the impact of self-focused upward counterfactuals on leadership task performance. Thus, the lack of support for hypothesis 5a is an important finding for integrating counterfactual thinking theory with reflection (e.g. after-event-reviews) in management studies. Upon further review of the reflection content, it became evident that the lack of support for hypothesis 5a is likely attributable to multiple factors.

From a design point of view, it was not possible for some participants to implement their self-focused upward counterfactuals in Time 2 tasks. For example, one participant stated, “One of the biggest things I could have done differently on this activity was to complete it in seclusion, because I was easily distracted by other individuals, which I feel hindered my ability to fully comprehend the meetings...” (Participant 133). Because I instructed participants to complete the study in one sitting, it was not possible for this participant to implement the counterfactual in Time 2 tasks as, presumably, it would require him or her to disconnect temporarily from the simulation while relocating. Similarly, some participants generated self-focused upward counterfactuals about alternate statements they would have made to their subordinates, as well as alternate rewards and punishments they would have used to attain a better outcome. However, in this simulated environment, unless their counterfactuals aligned with one of the three available options at each decision point in Time 2 tasks, they were not able to apply their counterfactuals to subsequent behaviors.

From a theoretical point of view, it is possible that the lack of support for hypothesis 5a can be attributed to affective contrasts resulting from self-focused upward comparisons. For some participants, upward counterfactual thinking may have triggered regret and led to distress (Davis, Lehman, Wortman, Cohen Silver, & Thompson, 1995; Gilbar & Hevroni, 2007), thereby hindering their performance on Time 2 tasks. Prior research suggests that when participants suffer from depression or anxiety, they may be particularly prone to such effects of counterfactual thinking (Markman & Miller, 2006).

Based on my findings, it is also important to ask whether self-focused upward counterfactuals differentially affect performance on closed versus open skills. Closed skills (e.g. computer software skills) require individuals to behave in a particular way based on a set of rules, whereas open skills (e.g. leadership) are more variable and, thus, are associated with multiple behaviors rather than a set of rules (Yelon & Ford, 1999). Studies have demonstrated that, individuals often need supportive contexts to transfer learning from open skills training to subsequent tasks (Blume, Ford, Baldwin, & Huang, 2010). In the current study, participants did not have access to a supportive context (i.e. mentoring, peer interaction, etc.). As such, this may explain why some participants in the current study, which focused on open skill training, did not transfer learning to Time 2 tasks. Again, this is an important consideration because prior counterfactual thinking studies have typically assessed the effects of counterfactual thinking on closed skills (e.g. anagram performance).

Additionally, it is possible that implicit leadership theories (ILT) (e.g. Cronshaw & Lord, 1987; Shondrick & Lord, 2010) affected how participants attended to their feedback and, consequently, how they responded to it. ILTs are cognitive structures or prototypes that specify the traits and abilities that characterize leaders and are developed through socialization and past experiences with leaders (Epitropaki, Sy, Martin, Tram-Quon, & Topakas, 2013). ILTs can influence selective attention, as well as how individuals think and act in leadership situations (Junker & van Dick, 2014).

To these points, my brief review of reflection content suggested that ILTs may have influenced participants' Time 1 behaviors, as one participant noted that he would have been "more encouraging but feared it appeared unprofessional" (Participant 149), as well as how participants interpreted and applied feedback in Time 2 tasks. Specifically, some participants expressed that to perform better (i.e. be a more effective leader) they would need to be "harsher" (Participant 205), "more strict" (Participant 100), and "more stern" (Participant 52).

These were interesting responses, as the feedback directed participants to encourage, reward, and engage participants in balanced conversation and participative decision-making (see Appendix J). Based on cognitive dissonance theory (Festinger, 1957), if the feedback was not aligned with participants' ILTs, they would likely try to reduce dissonance by avoiding self-focused counterfactuals that targeted the behaviors suggested in the feedback and, instead, generate self-focused upward counterfactuals that aligned with their cognitive schemas of effective leadership. Consequently, this could have lowered their Time 2 performance.

Finally, Noe (1986) defined motivation to transfer as a trainee's desire to use the knowledge and skills learned in training on the job. Transfer motivation is influenced by many factors, including attitudes towards training (Gegenfurtner, Veermans, Festner, & Gruber, 2009). As such, if participants approached the study solely as an opportunity to earn extra credit, rather than an opportunity to assess, to learn, and to develop their

leadership skills, then this could have negatively influenced transfer of learning from self-focused upward counterfactuals to Time 2 tasks.

Based on the lack of support for the direct relationship proposed in hypothesis 5a, it is not surprising that hypothesis 5b, which proposed that baseline performance discrepancy would indirectly affect performance through self-focused upward counterfactual thinking, was also not supported. In light of the preceding discussion, there are several potential boundary conditions that merit exploration and may result in a positive relationship between self-focused upward counterfactual thinking and performance, and a positive indirect effect of baseline performance discrepancy on performance through such thinking.

In the current study, I examined core self-evaluations (hypothesis 6) and counterfactual content specificity (hypothesis 7) as boundary conditions of the relationship between self-focused upward counterfactual thinking and performance. I expected that core self-evaluations would strengthen the relationship, because those with high core self-evaluations have increased confidence in their abilities and are more capable of mobilizing cognitive resources (Bono & Judge, 2003; Judge et al., 1998). Likewise, I expected that as the specificity of counterfactuals increase, the likelihood of creating strong links in memory and evoking behavioral change would increase. However, I did not find support for these relationships.

As previously noted, the training transfer literature suggests that environmental factors likely play an important role in whether individuals transfer learning from

counterfactuals to subsequent work tasks. When such factors are absent, one could expect that distal predictors of behavior (e.g. core self-evaluations) are not sufficient to promote the transfer of learning to performance. Similarly, recall that some participants generated counterfactuals that were beyond the scope of the simulation or misaligned with the feedback, consequently making the specificity level of counterfactuals less relevant than other considerations.

Academic Contributions and Practitioner Implications

My primary contribution to the management literature lies in identifying the types of thoughts individuals generate when they reflect on performance discrepancies. Consequently, this finding advances our knowledge of cognitive processes that are relevant for processing and learning from performance discrepancy feedback. To these points, my research demonstrates the usefulness of the functional theory of counterfactual thinking (Epstude & Roese, 2008) for further exploration of reflection in management studies.

My research also makes methodological contributions. Specifically, I developed my research setting with the most robust immersive learning simulation authoring tool available (NexLearn, 2016) and deployed it with emerging learning technologies that enable one to collect data about a wide range of experiences. In doing so, I created a valid and reliable high fidelity interactive simulation that promoted psychological realism in behavioral research. As noted in a participant's reflection, "I especially liked seeing

another human on the other side of the desk. This is very realistic because there will most likely always be another person sitting on the other side of the desk while you are addressing issues as a manager” (Participant 209). The use of social interaction simulations in behavioral research appears to be a viable option for balancing scholars’ desires to promote psychological realism (Colquitt, 2008) with their need to capture standardized observations that reduce biased assessments.

On a related note, my study advances knowledge about the usefulness of the incident isomorphic cloning procedure for the development of alternate problem descriptions and social interaction tasks. This approach has been utilized in prior studies (e.g. Anseel et al., 2009) for cloning electronic in-basket exercises, and scholars have encouraged the investigation of its effectiveness for other types of tasks and content (Lievens & Anseel, 2007). As such, the strong support found in my study for the effectiveness of the cloning procedure for developing alternate simulation content makes an important contribution to the literature on assessment center exercises.

Recent findings reported in the 2016 Deloitte Human Capital Trends Report suggest that 84% executives view learning as an important issue in their organization, and 44% of executives view it as very important. Thus, my research is important for academics and practitioners alike. These executives indicate that their companies are not developing skills fast enough nor leaders effectively. All the while, they are urged to implement employee-centric, technology-driven learning opportunities, such as experiential simulations (Deloitte University Press, 2016).

To these points, my research provides practical insights on how to develop reliable web-based simulations that can be used for initial skill assessment, technology-based training, or as a selection tool. Additionally, from a practical point of view, the counterfactual reflection intervention could be instrumental for developing employees after performance discrepancy feedback, as it can help them to identify alternate behavioral choices. Moreover, as seen in the current study, the reflection intervention can highlight misunderstandings employees may have about the content of feedback, thereby equipping managers with insight to aid in employee development and to minimize the impact of such misunderstandings on subsequent performance.

Limitations

My study is subject to a number of limitations. Foremost to this point, my sample was comprised of students, and their diligence, as well as their motivation to learn, while completing the simulation tasks and the reflection activity may not be representative of those who encounter learning opportunities in an organizational setting. Specifically, the reflection content indicated that some participants did not take the tasks seriously and, consequently, one may question the quality of the data. Additionally, the sample was relatively small and thus limited the power of statistical analyses. It will be important for future studies to investigate the usefulness of counterfactual thinking interventions with larger and more representative samples. Moreover, my data was collected within the same period of time, and I did not include a control group (i.e. no reflection) in this study.

Potential design limitations should also be noted. Despite the benefits of the social interaction simulation I developed for this study, there were also drawbacks to conducting the study in a web-based setting. Specifically, a considerable number of participants did not complete the study in its entirety. Aside from those who may have dropped out due to technical reasons, some participants expressed frustration with the time requirement on the reflection activity (i.e. the 5-minute minimum), as well as other design aspects such as not being able to replay audio-video content. It is plausible that these or similar design properties within the simulation influenced participants' willingness to complete the study.

My attrition bias analyses revealed age and work experience differences between my final sample and those in the attrition groups. Despite this, and as previously noted, I do not believe this was a substantial shortcoming. The characteristics of my final sample were more closely aligned with my desired sample.

Concerning the manipulations in this study, as previously stated, the analyses revealed that the manipulations were not fully effective. Specifically, the manipulations of psychological empowerment did not facilitate distinct conditions of low and high psychological empowerment and, overall, the psychological empowerment scores were compressed at the high end of the scale. Similarly, the feedback specificity manipulations were not fully effective, as there was no significant mean difference between the low and moderate groups. As such, I combined the low- and moderate feedback specificity groups, which limited the variance on feedback specificity.

Finally, I measured the task-relevant knowledge construct with self-report survey questions. As such, participants' perceptions of their task-relevant knowledge may have differed from their actual levels of knowledge. Likewise, participants may have selected the responses they deemed as most socially desirable.

Directions for Future Research

Given the limitations of the current study and the lack of counterfactual thinking studies in management, there are substantial opportunities for future research on counterfactual thinking and reflection in the workplace. Specifically, I recommend that researchers devote attention to exploring other feedback characteristics and outcomes that may influence reflection. Moreover, future research should focus on ways to maximize the effectiveness of counterfactual thinking interventions. I outline these recommendations in detail below.

Although the findings of this study suggest that feedback specificity does not influence the extent to which individuals engage in self-focused upward counterfactual thinking, other feedback characteristics such as feedback format, as well as feedback outcomes such as feedback reactions are worth exploring. Prior research has demonstrated that feedback format influences feedback reactions as well as performance improvement. Specifically, Atwater & Brett (2006) investigated how feedback format influences individuals' feedback reactions and found that when individuals received text feedback about their leadership behaviors they were more angry, discouraged, and less

motivated than those who received numeric and comparative feedback. Moreover, feedback reactions were related to performance improvement. To these points, the current study included text feedback only and did not measure initial feedback reactions that may have affected the reflective processes. Although I did not quantitatively assess participants' feedback reactions, my brief qualitative review of reflection content suggests that some participants focused on their reactions while reflecting. For example, participants commented, "I am satisfied with my performance rating" (Participant 49), "I am disappointed in my performance" (Participant 19), and "I do believe that I did better than the grade shown" (Participant 54). To help individuals process feedback more effectively, perhaps reflection prompts should vary based on recipients' initial feedback reactions or target specific aspects of reflection (e.g. counterfactual thinking, self-explanation). In turn, this may lead to more focused reflection and higher levels of improvement. A deeper understanding of how feedback format and feedback reactions, as well as other feedback characteristics (e.g. feedback frequency) influence reflection are important for enhancing its effects on performance.

Similarly, it is important to identify how design changes to reflection interventions may enhance their effectiveness. To this end, the training literature may offer insight. For example, according to Noe & Colquitt (2002) individuals' motivation to learn increases when the objectives, purpose, and intended outcomes of a training intervention are clearly communicated to participants. The current study did not inform participants of the various types of counterfactual thoughts or the associated benefits, as

demonstrated in psychology studies (see Epstude & Roese, 2008). Future studies should explore the impact of such on the extent to which participants engage in reflection and the extent to which they transfer learning to subsequent tasks.

Another promising avenue for future research is to combine counterfactual thinking interventions with prompts that target goal-setting or prefactual thinking. Prefactual thoughts are mental simulations about strategies and outcomes before the actual outcomes are known (Scholl & Sassenberg, 2014). Thus, individuals engage in prefactual thinking prior to engaging in a course of action. In the current study, it appears that some participants had difficulty applying what they had learned through reflection to subsequent interactions. Perhaps forward-focused activities such as goal-setting or prefactual thinking can increase the effectiveness of lessons learned through counterfactual thinking.

Finally, scholars should devote attention to investigating the effectiveness of counterfactual thinking for feedback processing in applied settings. Because the current was set in a virtual workplace, it remains to be seen how environmental factors (e.g. peer and supervisor support) influence whether lessons learned through counterfactual thinking are applied to subsequent tasks. Scholars should explore such possibilities in future studies.

Conclusion

This research established a new direction for reflection studies in the management literature by integrating counterfactual thinking theory from the psychology literature.

While management scholars have highlighted the benefits of reflection for learning from feedback and experiences (e.g. Ellis et al., 2014), prior studies have not accounted for the unique contribution of counterfactual thinking to learning. Moreover, little focus has been given to individual written forms of reflection (e.g. Anseel et al., 2009).

To enhance our understanding of reflective processes following performance discrepancies, my research untangled counterfactual thinking from other aspects of reflection (e.g. self-explanation). Additionally, using an individual written reflection intervention, I explored whether and under what conditions performance discrepancies indirectly effect performance through self-focused upward counterfactual thinking. To these ends, I developed and validated a leadership skill social interaction simulation capable of reliably assessing leadership skill performance over alternate task rounds.

My research demonstrated that when individuals encounter performance discrepancies they are likely to engage in self-upward counterfactual thinking, during which they consider how they could have altered their behaviors to attain better performance outcomes. Overall, such thinking has supported learning in prior research in the psychology field; however, my research underscores the need to investigate environmental factors and intervention design properties that may exert unique effects of counterfactual thinking on applied task performance. I anticipate that as our understanding of the influence of such factors on this common feature of human cognition (Sanna et al., 2003) develops, we will be able to identify ways to enhance the effectiveness of performance discrepancy feedback.

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APPENDICES

Appendix A

Table 27

Behaviorally Anchored Rating Scale: Management of Personnel Resources

Management of Personnel Resources: Motivating, developing, and directing people as they work.	
	HIGH SKILL PROFICIENCY
7	Creates work environment that recognizes and rewards employee goal accomplishment and shows sensitivity to employee personal needs
	Develops employees by recognizing their strengths, correcting their weaknesses, and affirming their sense of competency
6	Proactively offers and assists employees in developing insight, as well as objective and descriptive information, that facilitates performance improvement and skill development
	Engages employees in participative decision-making and utilizes active listening and questioning techniques to create balanced conversations for constructing and implementing development plans
5	MODERATE SKILL PROFICIENCY
4	Attempts to motivate others by providing feedback and encouragement and being aware of personal needs
	Recognizes and points out to employees their areas of strengths and weaknesses
	Provides specific directions to employees to facilitate performance improvement and skill development
3	Creates performance plans which include work standards, goals, and objectives
	LOW SKILL PROFICIENCY
2	Does not motivate or encourage others to exert more effort on task accomplishment or recognize personal needs
	Unaware of differences in employee work performance or overreacts to subordinate weaknesses and fails to recognize strengths
1	Fails to provide and to help employees develop useful information and clear performance standards for performance improvement and skill development
	Rejects employees' input, fails to demonstrate active listening and questioning techniques that engage employees in two-way developmental conversations

Table 28

Behaviorally Anchored Rating Scale: Negotiation

Negotiation: bringing others together and trying to reconcile differences	
	HIGH SKILL PROFICIENCY
7	<ul style="list-style-type: none"> Redirects focus of conflict towards collective goals and needs/interests of multiple parties Pursues conflict resolution by establishing and nurturing positive, open communication that includes active listening techniques
6	<ul style="list-style-type: none"> Generates creative solutions to address challenges and conflicts and to meet the needs of multiple parties Proactively seeks the input and suggestions of others to resolve conflict Skillfully maintains composure and responds calmly in conflict situations
	MODERATE SKILL PROFICIENCY
5	<ul style="list-style-type: none"> Acknowledges the needs/interests of others during conflicts
4	<ul style="list-style-type: none"> Responds to requests for information during conflicts Proposes alternative responses to resolve conflict
3	<ul style="list-style-type: none"> Acknowledges the input of and suggestions of others in conflicts Avoids strong emotional reactions in conflict situations
	LOW SKILL PROFICIENCY
2	<ul style="list-style-type: none"> Fails to acknowledge the needs/interests of others during conflicts Withholds information that can lead to conflict resolution
1	<ul style="list-style-type: none"> Attempts to control and manipulate others, pressures others to accept unreasonable conflict solutions Loses self-control, jumps to conclusions during conflict situations which complicates stressful situations Avoids or rejects inputs and suggestions of others in conflict situations

Appendix B

Counterfactual Thinking Reflection Prompt

Often after something happens, we tend to think about what could have been different that would have brought about a different outcome to the event. For example, after receiving poor performance feedback on a course project, one may think, “If only my professor had provided clearer instructions, I could have earned a higher grade.” Or you may think, “If only I didn’t procrastinate, I could have done a better job with this project.” You could also think, “At least the project wasn’t weighted heavily in my final course grade, or it would have lowed my GPA.” Think about the performance feedback you just received. Please use as much or as little of the space below to list any thoughts about what could have been different to lead to a different performance outcome. Many participants find it easier to use a bullet-point format to list their thoughts. When sharing your thoughts, please use complete sentences.

Appendix C

Table 29

The Core Self-Evaluation Scale
(Judge et al., 2003)

1	I am confident I get the success I deserve in life.
2	Sometimes I feel depressed. (r)
3	When I try, I generally succeed.
4	Sometimes when I fail I feel worthless. (r)
5	I complete tasks successfully.
6	Sometimes, I do not feel in control of my work. (r)
7	Overall, I am satisfied with myself.
8	I am filled with doubts about my competence. (r)
9	I determine what will happen in my life.
10	I do not feel in control of my success in my career. (r)
11	I am capable of coping with most of my problems.
12	There are times when things look pretty bleak and hopeless to me. (r)

r= reversed scored

Appendix D

Table 30

The Efficient Assessment of Need for Cognition
(Cacioppo et al., 1984)

1	I would prefer complex to simple problems.
2	I like to have the responsibility of handling a situation that requires a lot of thinking.
3	Thinking is not my idea of fun. (r)
4	I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. (r)
5	I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.
6	I find satisfaction in deliberating hard and for long hours.
7	I only think as hard as I have to. (r)
8	I prefer to think about small, daily projects to long-term ones. (r)
9	I like tasks that require little thought once I've learned them. (r)
10	The idea of relying on thought to make my way to the top appeals to me.
11	I really enjoy a task that involves coming up with new solutions to problems.
12	Learning new ways to think doesn't excite me very much. (r)
13	I prefer my life to be filled with puzzles I have to solve.
14	The notion of thinking abstractly is appealing to me.
15	I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
16	I feel relief rather than satisfaction after completing a task that required a lot of mental effort. (r)
17	It's enough for me that something gets done; I don't care how or why it works. (r)
18	I usually end up deliberating about issues even when they do not affect me personally.

r= reversed scored

Appendix E

Table 31

Learning Goal Orientation Subscale
(VandeWalle et al., 2001)

1	I prefer challenging and difficult classes so that I'll learn a great deal.
2	I truly enjoy learning for the sake of learning.
3	I like classes that really force me to think hard.
4	I'm willing to enroll in a difficult course if I can learn a lot by taking it.

Appendix F

Table 32

Revised NEO-PI Inventory (NEO-PI-R) Conscientiousness Scale Items
(Costa & McCrae, 1992)

I see myself as...	
1	Self-disciplined
2	Competent
3	Orderly
4	Dutiful
5	Deliberate
6	Achievement oriented

Appendix G

Table 33

Task-Relevant Knowledge Scale

In a supervisory role, individuals often engage in many tasks to manage personnel resources. Several tasks commonly performed to manage personnel resources are provided below. Please rate the extent to which your professional training and experience provides you the knowledge to:

1	Create a work environment that recognizes employee goal accomplishment
2	Create a work environment that rewards employee goal accomplishment
3	Create a work environment that shows sensitivity to employee needs
4	Develop employees by recognizing their strengths
5	Develop employees by correcting their weaknesses
6	Develop employees by affirming their sense of competency
7	Assist employees in developing insight that facilitates performance improvement
8	Assist employees in developing information that facilitates performance improvement
9	Engage employees in participative decision-making for constructing development plans
10	Engage employees in participative decision-making for implementing development plans
11	Utilize communication techniques that create balanced conversations for constructing and implementing development plans

Appendix H

Table 34

Feedback Specificity Manipulation Check
(Goodman et al., 2004, 2011)

1	I received detailed feedback about my performance as a Special Order Manager.
2	I was given specific feedback about my performance as a Special Order Manager.

Table 35

Adapted Manipulation Check for the Current Study

1	I received detailed feedback about my performance as a <i>manager</i> .
2	I was given specific feedback about my performance as a <i>manager</i> .

Note: Adaptations indicated in italics.

Appendix I

Table 36

Psychological Empowerment in the Workplace Scale
(Spreitzer, 1995)

Items measuring meaning dimension	
1	The work I do is very important to me.
2	My job activities are personally meaningful to me.
3	The work I do is meaningful to me.
Items measuring competence dimension	
4	I am confident about my ability to do my job.
5	I am self-assured about my capabilities to perform my work activities.
6	I have mastered the skills necessary for my job.
Items measuring self-determination dimension	
7	I have significant autonomy in determining how I do my job.
8	I can decide on my own how to go about doing my work.
9	I have considerable opportunity for independence and freedom in how I do my job.
Items measuring impact dimension	
10	My impact on what happens in my department is large.
11	I have a great deal of control over what happens in my department.
12	I have significant influence over what happens in my department.

Table 37

Adapted Psychological Empowerment Scale for the Current Study

Items measuring meaning dimension	
1	The work I do <i>as a manager</i> is very important to me.
2	My job activities <i>as a manager</i> are personally meaningful to me.
3	The work I do <i>as a manager</i> is meaningful to me.
Items measuring competence dimension	
4	I am confident about my ability to do my job <i>as a manager</i> .
5	I am self-assured about my capabilities to perform my work activities <i>as a manager</i> .
6	I have mastered the skills necessary for my job <i>as a manager</i> .
Items measuring self-determination dimension	
7	I have significant autonomy in determining how I do my job <i>as a manager</i> .
8	I can decide on my own how to go about doing my work <i>as a manager</i> .
9	I have considerable opportunity for independence and freedom in how I do my job <i>as a manager</i> .

Items measuring impact dimension	
10	My impact on what happens in my department is large.
11	I have a great deal of control over what happens in my department.
12	I have significant influence over what happens in my department.

Note: Adaptations indicated in italics.