COUNTERFACTUAL VIEWPOINTS: HOW OUR VIEWPOINT OF UNDOING THE PAST SHAPES OUR FUTURE EXPECTATIONS AND PERFORMANCE

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STEPHANIE B. THOMAS

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Approved By:

John V. Petrocelli, Ph.D., Advisor

Catherine E. Seta, Ph.D., Chair

Steven Giles, Ph.D.

Lisa Kiang, Ph.D.

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ABSTRACT

Increasing research attention has been given to the impact of *visual viewpoints* involved in imagination and memory, as well as the perceived likelihood of counterfactual alternatives (i.e., *counterfactual potency*), on subsequent psychological and behavioral reactions. Yet, the possibility of *counterfactual viewpoints* has not been investigated. The purpose of this study was to examine the effect manipulating counterfactual viewpoint has on succeeding expectancy and performance, and whether these relationships are mediated by counterfactual potency. Participants' were instructed to simulate upward counterfactual thoughts about their performance in an initial Ping Pong game from either the field or observer counterfactual viewpoint; after which, they reported their counterfactual potency and future performance expectations before playing the game a final time. As hypothesized, the results revealed that among those with high domain-specific ability the observer counterfactual viewpoint led to greater perceived likelihood of counterfactual alternatives, and in turn, greater optimism for future performance. Interestingly, however, it was the field counterfactual viewpoint that actually led to better performance. Explanations for these findings and implications for the construct of counterfactual viewpoints are discussed.

INTRODUCTION

Mental simulation refers to the formation and rehearsal of cognitive representations of real or imaginary events (e.g., Markman, Klein, & Suhr, 2009; Pham & Taylor, 1999; Vasquez & Buehler, 2007). Such mental activity can involve the imagination of present or future events, as well as the rehearsal or undoing of past events. By actively imagining specific events, the association between thought and action is enhanced influencing subsequent thoughts, feelings, and behavior in present time (Pham & Taylor, 1999). Thus, mental simulation has an essential role in behavioral intentions (e.g., Epstude & Roese, 2008; Pham & Taylor, 1999; Roese, 1997), affective reactions (e.g., Landman, 1987; Nigro & Neisser 1983; Robinson & Swanson, 1993), goal-pursuit (e.g., Oettingen & Mayer, 2002; Vasquez & Buehler, 2007), impressions and judgments (e.g., Frank & Gilovich, 1989; Gleicher et al., 1990; Miller & Gunasegaram, 1990; Sherman & McConnell, 1995), and predictions about the future (e.g., Kahneman & Tversky, 1982; Libby & Eibach, 2009; Roese & Sherman, 2007).

One feature of mental simulation that is particularly important to resulting psychological and behavioral reactions is the visual perspective from which the event is simulated. The perspective from which a person mentally simulates a real or hypothetical event has been consistently linked to the content of their cognitive representations of the event (e.g., Libby & Eibach, 2009; Vasquez & Buehler, 2007). Here, the two visual viewpoints, namely the field and observer perspectives, and their relevance to mental simulations involved in imagination and memory are discussed. Furthermore, a third type of mental simulation involving the undoing of past events (i.e., counterfactual thinking) and its ability to influence affective, cognitive, and behavioral reactions is reviewed.

Finally, a construct not currently acknowledged in the literature is presented, that of counterfactual viewpoints, and its potential impact on future expectations and performance is considered.

Visual Viewpoints

Mental simulations involved in imagination and memory are characterized by the *field* (e.g., first-person) or *observer* (e.g., third-person) visual viewpoint. Mentally simulating an event from the field perspective involves imagining a situation or recalling an event and its surroundings as if one is looking through his or her own eyes, perceiving the event from its actual or its original perspective. Conversely, when imaging or recalling an event from the observer viewpoint, a person takes the position of an onlooker, simulating the situation and one's surroundings as if he or she is observing the event from the outside as an observer would (Nigro & Neisser, 1983; Robinson & Swanson, 1993). The current literature demonstrates that the perceptual viewpoint one takes when mentally simulating a past or future event impacts resulting affect, judgment, and decision-making.

Visual viewpoints and memory. Research on the field and observer visual perspectives had been dominated by the domain of autobiographical memory. The autobiographical memory system is comprised of the recollected events that are connected to a person's life. The fact that autobiographical memories can be perceived from multiple visual viewpoints accentuates the dynamic nature and malleability of autobiographical knowledge bases (Conway & Pleydell-Pearce, 2000). That is, people generally experience personal events through their own eyes, but remembering the event from the observer perspective suggests transformation of the original memory (Nigro &

Neisser, 1983). Moreover, the perspective from which a memory is recalled has a profound impact on the process of recalling the original experience, as well as, how one perceives the experience and themself in present time (Libby & Eibach, 2002; Nigro & Neisser, 1983).

There are several defining characteristics that distinguish the field and observer visual perspectives in autobiographical memory retrieval. Nigro and Neisser (1983) were the first researchers to empirically test the distinction between field and observer memories. They asked undergraduate students to recall memories for eight specific situations (e.g., watching a horror movie) and classify their retrieved memory as field, observer, or neither. Participants were also instructed to indicate an approximate date for when the remembered event took place and rate the memory on vividness. Nigro and Neisser (1983) found that the majority of recalled memories by participants were classified as field rather than observer; however, this general effect was qualified in that older memories were recalled more frequently from the observer viewpoint and more recent memories were recalled more frequently from the field viewpoint. Furthermore, they found that recent events were rated higher for vividness and were described as being better remembered, two characteristics they also found to be true of events remembered from the field perspective in general (Nigro & Neisser, 1983). Older memories likely produce recall from the observer perspective more than recent memories due to the implication that older memories have been rehearsed more frequently, and thus, have had greater time to undergo the reconstructive process (Nigro & Neisser, 1983; Robinson & Swanson, 1993; Terry & Horton, 2008). Additionally, recent lifetime periods may have stronger autobiographical knowledge bases, thereby activating more event-specific

knowledge, and hence leading people to remember the vivid details of the event from its original perspective (see Conway & Pleydell-Pearce, 2000; Robinson & Swanson, 1993)

In addition to memory age, the emotional impact of the original experience also plays a role in how a personal memory is later reconstructed. In general, the consensus is that emotional events are usually recalled from a field perspective rather than an observer perspective. D'Argembeau, Comblain, and Van Der Linden (2003) had participants recall two positive, two negative, and two neutral autobiographical memories and share both the details of their memories and the visual viewpoint from which their memories were recalled. They found that both positive and negative emotional events were frequently recalled from the field perspective in comparison to the observer perspective. Perhaps one reason emotional events are often recalled from a field perspective can be ascribed to the infrequency of their recall, thereby resisting reconstruction and maintaining their original point of view (Nigro & Neisser, 1983).

Contradictory to the conception that emotional events are typically recalled from a field perspective, Nigro and Neisser (1983) found that memories for events involving high levels of emotional self-awareness tended to be recalled from the observer perspective, such as when participants were asked to recall a time they gave a speech. On the basis of such findings, Berntsen and Rubin (2006) considered whether memories for reflexive emotional events that have a significant self-awareness component (e.g., pride and shame) would elicit more observer perspective recall than memories for nonreflexive emotions. Contrary to their expectations, however, the researchers did not find a significant difference between memories for reflexive emotions and memories for nonreflexive emotions for the observer mode of recall (Berntsen & Rubin, 2006).

Additionally, the idea that emotional events are tied to a field perspective is further undermined for intense traumatic memories. Porter and Birt (2001) had participants recall both their most traumatic and their most emotionally positive experiences to date. They found that in comparison to their positive emotional counterparts, traumatic memories were recalled more from an observer viewpoint. Traumatic memories in this study were also reported to be thought about more often, thus suggesting memory reconstruction may play a role in recall perspective (Porter & Birt, 2001). Moreover, granted that the field perspective has been consistently linked to more vivid, detailed, and intensive memory recall, people may adopt the observer perspective when remembering a traumatic and otherwise emotionally intensive event in order to avoid the emotionally intensified recall associated with field memories (McIssac & Eich, 2002, 2004). For instance, McIssac and Eich (2004) found that 89% of PTSD patients who claimed to recall their traumatic event most frequently from the observer perspective also admitted to doing so in order to avoid reliving the horror of the event.

Just as emotionality of the original experience affects the perspective from which the memory is recalled, the perspective from which a memory is recalled in turn affects present emotional reactivity. In general, memories recalled from the field perspective are experienced as more emotionally intensive than those recalled from the observer perspective (Berntsen & Rubin, 2006; McIssac & Eich, 2002; Robinson & Swanson, 1993; Terry & Horton, 2008). For example, McIssac and Eich (2002) had undergraduate students complete a series of manual 10 minute tasks (e.g., molding clay and lifting small barbells), and later asked them to recall the experiences they had while implementing these tasks from either the field or observer point of view. The researchers found that,

despite the mundane nature of the tasks, participants in the field perspective condition rated their memories as more emotional and more detailed than participants in the observer perspective condition (McIssac & Eich, 2002). Similarly, in utilizing a within-subjects design, Terry and Horton (2008) found that recalling emotional events from a field perspective evoked more state emotionality, nervousness and self-consciousness than when the same individuals recalled the event from an observer perspective.

Despite the consensus of the aforementioned research that the field perspective leads to greater felt emotion in present time, Valenti, Libby, and Eibach (2011) argued this conclusion is dependent on the meaning-making of the features of the incidence recalled. They emphasized that previous research has focused on emotion stemming from the recall of concrete details of events, which may be more characteristic of the field viewpoint, rather than more abstract features of the event such as goals, traits, and general self-knowledge, which may be more characteristic of the observer viewpoint. The researchers conducted three experiments in which they manipulated whether participants visualized regretted actions or inactions, as well as the perceptual viewpoint participants used to recall these events. They found that participants felt more regret when picturing actions from the field as opposed to the observer visual perspective. This effect was reversed, however, when recalling regretted inactions: participants expressed more regret for inactions when visualizing the event from the observer rather than field perspective (Valenti et al., 2011). Valenti et al. (2011) argued that the field perspective's focus on contextual details activates salient negative consequences of regrettable actions that evoke negative affect. The observer perspective does not seem to elicit this extent of negative emotion for regrettable actions, however, in that these actions are relatively

insignificant in a broader life context. On the contrary, regrettable inactions stimulate more regret when thinking about their broader impact on goals and states since negative consequences are generally less salient. Hence, for regrettable inactions, the observer perspective evokes more negative emotion than the field perspective given its more abstract focus (Valenti et al., 2011). Thus, whether or not the visual perspective results in negative emotion is dependent on whether the emotion arises from the concrete details of the event or from the broader meaning of the event relative to one's life in general (Valenti et al., 2011).

Finally**,** a person's focus or purpose in recalling a specific autobiographical memory impacts the visual viewpoint from which the memory is retrieved. The fact that events can be remembered from both perspectives and people can even successfully switch between the two, suggests that the specific perspective from which one recalls an autobiographical memory may be individually chosen to some degree, even if unknowingly. Nigro and Neisser (1983) found that when attempting to remember feelings associated with a personal event, individuals tended to recall that experience from a field perspective. On the other hand, when individuals attempted to recall the objective facts surrounding a personal event, they tended to recall that experience from an observer perspective. Furthermore, a third group, who was not given any instructions as to how to approach the recall of the personal experiences, also reported more recall from a field viewpoint than from an observer viewpoint (Nigro & Neisser, 1983). Thus, when a person has no particular aim in recall he or she may instinctively try to remember the way he or she felt during the original experience, suggesting the field perspective is likely the default mode of recall. This finding is consistent with research demonstrating memories

are typically recalled more from a field perspective and the idea that the field perspective tends to be more congruent with the original, pre-reconstructed, memory (Nigro & Neisser, 1983). Therefore, greater effort and motivation is likely involved in opting to recall a memory from the observer perspective opposed to the field perspective.

One such occasion lending to the motivation to adopt the observer perspective rather than the field perspective may be when a person's attributions toward the recalled event are more dispositional (e.g., focus on one's personality, character, attitudes, etc.) rather than situational (e.g., focus on the event itself, others actions, etc.). Existing research suggests an "actor-observer" type bias for visual perspectives whereby visualizing events from an observer perspective is associated with the adoption of dispositional attributions, whereas visualizing events from the field perspective leads to more situational attributions (Frank & Gilovich, 1989). Frank and Gilovich (1989), for example, found that participants who remembered a three-week prior conversation from the observer perspective were more likely to attribute their behavior to characteristics of the situation, such as the topic of the conversation and the way their conversational partner behaved. Participants who used the field visual viewpoint to recall the conversation, however, attributed their behavior more to dispositional characteristics, such as their mood and personality (Frank & Gilovich, 1989). Similarly, Libby and Eibach (2002) found that participants are motivated to adopt the observer perspective rather than the field perspective when his or her present self-concept is incongruent with his or her past self-concept. Rather than attributing past behavior to uncontrollable situational forces, participants may recall events discrepant with their present self-

concept from the observer perspective as a way to justify their new self as distinct from their past self (Libby & Eibach, 2002).

Current literature, on the other hand, suggests that one's visual viewpoint is dependent on the focus of one's mindset as conceptual or experiential (Libby & Eibach, 2011; Valenti et al., 2011). An experiential mindset is characteristic of the field visual perspective in that it defines events in terms of specific experiences, with a focus on discrete actions, physical and psychological states, and emotions specific to those experiences. In contrast, a conceptual mindset is specific to the observer perspective in that event representations are defined in terms of their meaning in the broader context of one's life, usually activating personal beliefs, goals, traits, and other forms of self-knowledge (Libby & Eibach, 2011). Thus, the field perspective allows for a bottom-up understanding of events and the observer perspective facilitates a top-down understanding. The memory perspective utilized when recalling a memory determines the meaning of the event and whether its content will be more in the form of a specific experience or whether it will be remembered more abstractly for its broader significance in the person's life (Libby & Eibach, 2009).

Visual viewpoints and imagination. Stemming from the pervasive literature exploring memory perspectives in autobiographical memory recall, researchers have also explored visual viewpoints involved in imagination. The perspective one takes to imagine future events has been found to significantly impact a person's self-concept, present emotion and behavior, and future goal planning and completion (Libby & Eibach, 2009, 2011; Libby Shaeffer, Eibach, & Slemmer, 2007; Vasquez & Buehler, 2007). Notably,

imagery perspectives are akin to memory perspectives in the content, emotion, and meaning they evoke.

For instance, the observer viewpoint in imagery is involved with abstract construals (e.g., traits, goals, consequences, etc.) and the first-person viewpoint is linked to concrete construals (e.g., specific experiences, component processes, etc.) as was found true for the two perspectives of memory (Libby & Eibach, 2011). Libby, Shaeffer, and Eibach (2009) found evidence for a bidirectional link between imagery perspectives and the meaning people derive from actions (e.g., action identification). Specifically, they had participants envision themselves completing various common tasks, such as reading, doing laundry, or taking a test, and manipulated the visual perspective participants used (Study 1a) and the descriptions of the actions as abstract or concrete (Study 1b). Their participants tended to explain the actions more abstractly when simulating them from the observer visual perspective and more concretely when simulating them from the field perspective. Moreover, actions described abstractly (e.g., in terms of how it was performed) were more likely to be imagined from the observer viewpoint, whereas actions described more concretely (e.g., in terms of why it occurred) were more likely to be visualized from the field viewpoint (Libby et al., 2009). Likewise, Libby and Eibach (2011) found that participants imagining a desired interview used the observer visual perspective more when placing the interview in the broader context of their life and used the field perspective more when focusing on the experience of the interview itself, regardless of whether the result imagined was negative or positive. Hence, visual perspectives in imagination were closely associated with meaning-making as they are in memory.

Moreover, recent research on the impact of imagery viewpoints on present affective states has demonstrated similar findings to those aforementioned for visual perspectives used in memory recall. Just as existing research suggests remembering events from the field perspective elicits greater emotion in present time (Berntsen & Rubin, 2006; McIssac & Eich, 2002; Robinson & Swanson, 1993), Holmes, Coughtrey and Connor (2008) found that imagining descriptions of events with positive outcomes from a field perspective evokes greater positive emotion than imagining the same events from the observer perspective. They explained these findings by suggesting that the observer perspective promotes evaluative comparisons not readily activated from the field perspective (Holmes et al., 2008). It is noteworthy, then, that the researchers specifically had participants imagine the experience and concrete details of the event rather than the abstract significance of the event to one's self. Hence, as proposed by Valenti et al. (2011), the observer perspective may elicit greater positive emotion in imagination when focusing on future events that are connected to a person's abstract goals and traits as opposed to the component processes of the event.

Most influential, however, are recent findings suggesting the visual viewpoint from which one imagines future actions and events can impact his or her motivation and consequent behavior (Libby et al., 2007; Vasquez & Buehler, 2007). If indeed the observer imagery perspective is associated with abstract construals, then utilizing this viewpoint when imaging a desired future action should facilitate an individual's simulation of the event in line with his or her goals and self-concept. In turn, imagining an event in such a way should increase the motivation to pursue this action in the future. For example, Vasquez and Buehler (2007) had participants imagine the successful

completion of an upcoming academic task from either the field or observer visual perspective and rate their construal in terms of its meaning and significance. They found that participants who envisioned future academic success from the observer perspective indicated higher levels of motivation than those who used the field perspective. Moreover, the level of abstraction involved in participants' simulation of the event mediated this relationship, such that those who used the observer perspective were more likely to focus on the importance and broader significance of the event, which subsequently led to greater achievement motivation (Vasquez & Buehler, 2007).

Furthermore, Libby et al. (2007) found that the observer imagery perspective not only leads to an increase in motivation to achieve a desired event, but also directly impacts the likelihood of a person executing the imagined action. The night before the 2004 US presidential election, the researchers had registered voters imagine themselves voting in the election from either the field or observer imagery viewpoint. They then followed up with participants to determine whether they actually voted or not. Participants who were told to adopt the observer visual perspective when imaging themselves voting were more likely to actually vote in the election than those who were told to use the field visual perspective. Additionally, this result was mediated by participants reported pro-voting mindset, such that participants in the observer condition embraced stronger pro-voting mindsets, which in turn made them more likely to vote (Libby et al., 2007). Hence, seeing oneself from the outside as an observer would compels one to attribute the event in terms of its coherence with his or her identity, making it more likely that the imagined behavior will occur. Therefore, imagery perspectives may have profound implications for decision-making and goal-pursuit.

Counterfactual Thinking

In addition to the recall of memories and the imagination of future events, another frequently studied form of mental simulation is counterfactual thinking. Counterfactual thinking involves mentally simulating alternatives to reality and imagining the repercussions of those alternatives (Roese, 1997). Such thoughts are usually in the form of conditional "if…then" statements linking an antecedent that mutates a past state or event (e.g., "If only I had gone to graduate school") to a consequent outcome (e.g., "then I would have been selected for the new position"). Existing research identifies several different types of counterfactuals as well as multiple factors that influence their production. Moreover, such mental activity has been found to have both a positive and negative impact on individual affective and behavioral responses (Epstude & Roese, 2008).

Subtypes of counterfactual thoughts. Counterfactual thoughts vary in terms of their direction, mode, structure, and focus (Epstude & Roese, 2008). The alternatives produced in counterfactual thinking can either be characterized by an upward direction in that they improve on reality (e.g., "If only I studied more, then I may have received an A on my exam") or a downward direction in that they worsen reality (e.g., "If I had studied any less, then I may have failed the exam"; Markman, Gavanski, Sherman, & McMullen, 1993). Existing research suggests upward counterfactuals tend to be more prevalent than downward counterfactuals (Markman et al., 1993; Roese & Hur, 1997; Summerville & Roese, 2008). Additionally, counterfactuals can be simulated from either an evaluative or reflective mode of thinking (Markman & McMullen, 2003). When simulating evaluative counterfactuals, individuals contrast an alternative outcome for what could have

happened to the reality of the outcome that actually occurred (e.g., “If I had made that shot I could have scored in the double-digits, but instead I scored nine points”). When simulating reflective counterfactuals, on the contrary, individuals assimilate an alternative outcome for what could have happened with reality and imagine it as if it actually occurred, focusing only on the alternative (e.g., “What if I had actually scored double-digit points tonight?”). Reflective counterfactuals occur more frequently when a comparison standard for the self is salient, whereas evaluative counterfactuals tend to occur when no such information is available (Markman & McMullen, 2003). Moreover, the structure of a counterfactual can be additive such that the antecedent focuses on an inaction not taken (e.g., “If only I had taken back roads, then I would not be stuck in traffic”) or subtractive such that the antecedent removes an action that was previously done (e.g., “If only I had not taken the highway, then I would not be stuck in traffic”; Roese & Olson, 1993). In general, people tend to generate additive alternatives more frequently than subtractive alternatives (Roese, Hur, & Pennington, 1999). Finally, counterfactual statements can either focus on the self (e.g., “If only I had played better, then we would have won our tennis match”) or others (e.g., “If only my partner had played better, then we would have won our tennis match”). One’s own actions tend to be the focus of counterfactual thoughts more so than the actions of others (Davis, Lehman, Wortman, Silver, & Thompson, 1995; Summerville & Roese, 2008).

Factors that influence counterfactual thinking. There are several noteworthy factors that differentially influence the activation and the content of counterfactual thoughts. Whereas activation refers to the initial induction of counterfactual thinking (e.g., the on-off switch), content refers to the composition or substance of the ensuing

counterfactual thoughts (Roese, 1997). Roese (1997) argued that counterfactual thoughts are typically activated in reaction to negative affect. Specifically, when a person feels "down" he or she may be inclined to imagine what might have been "if only" he or she had acted in a different way. Davis et al. (1995) found that mothers who expressed greater negative affect immediately after the loss of their child in a car accident reported consuming greater counterfactual thoughts compared to those who expressed lower levels of negative affect. Moreover, existing research suggests that spontaneous counterfactual thinking is more frequent following undesirable outcomes or failures than following desirable outcomes or success (e.g., Sanna & Turley, 1996), although some studies which directly elicited the counterfactual thought simulation have not found this effect (e.g., Markman et al., 1993). Roese and Olson (1997) more directly tested the impact of affect on counterfactual activation, in addition to outcome valence, by having participants complete an anagram task and then providing fabricated performance feedback. They found that participants responded quicker to counterfactual prompts when given negative feedback in comparison to participants given positive feedback. Significantly, when the researchers controlled for affect this effect was diminished, thereby suggesting negative affect is necessary for counterfactual activation (Roese & Olson, 1997).

While negative affect is believed to be essential for the activation of counterfactual thoughts, content is arguably influenced most by exceptions to normality (Roese, 1997). Once counterfactual thoughts are activated, the resulting counterfactual thought is said to be based on mutating an unusual event in light of a more "normal" one. The notion that abnormal circumstances are essential to producing alternatives was first proposed by Kahneman and Miller's (1986) norm theory, which holds that events which

are unexpected or surprising will evoke stronger activation of alternatives than events which are unsurprising or expected. Hence, it is easier to imagine how an unusual event leading to a given outcome could have occurred differently than a normal one. Stemming from this perspective, Wells, Taylor, and Turtle (1987) had participants read a scenario including three events that were individually described as either a norm or exception (e.g., Tony went to the aquatic center to swim on his routine Saturday or Tony went on Sunday this time instead). They found that participants tended to alter events that were framed as abnormal opposed to events framed as characteristic of the individual (Wells et al., 1987). Despite the pervasive finding in the literature that counterfactual content arises from the undoing of unusual circumstances, Wells and Gavanski (1989) argued this finding is limited only to outcomes that were also unusual. Mutating a factual antecedent in favor of an alternative that changes the outcome suggests the factual antecedent had a causal role in producing the original outcome. Hence, Wells and Gavanski (1989) argued that when unusual outcomes occur, people generally associate the cause of these outcomes to unusual precursors. If, however, the alternative would not alter the outcome even if made in favor of the norm (e.g., the subject would have died no matter if they had taken their usual as opposed to unusual route), mutability of the factual event in light of an alternative is not readily activated. Thus, it is perhaps the casual inferences drawn from counterfactuals that affect their content, not necessarily abnormal events (Wells & Gavanski, 1989).

Numerous other factors have been found to influence the simulation of counterfactual thoughts. First, outcome closeness is argued to impact the activation of counterfactual alternatives (Roese, 1997). Outcome closeness refers to how close one

perceives oneself to have been to achieving a specific counterfactual outcome or goal. For example, Meyers-Levy and Maheswaran (1992) had participants read a scenario about a man, Greg, who was too busy to sign a property insurance policy despite knowing its importance. When a fire destroyed his apartment, this decision ultimately left him losing his property without any insurance coverage. The authors manipulated outcome closeness in this scenario in that the fire was depicted to either have taken place three days or six months after the policy was prepared for Greg to sign. When participants were asked to spontaneously list their thoughts that came to mind while reading the scenario about Greg, Meyers-Levy and Maheswaran (1992) found that participants in the three-day temporal distance group reported significantly more counterfactual thoughts than participants in the six-month condition. Hence, the notion that Greg barely missed being able to file an insurance claim elicited the activation of counterfactual thoughts more so than the perception that he was far off. Thus, the perception of outcome closeness may activate counterfactual thoughts as a way to mutate a nearly missed antecedent in favor of achieving the aspired outcome (Roese, 1997).

Personal control over the outcome of an event is another factor that has been found to affect the content of counterfactual thoughts. Existing evidence suggests that antecedents that are perceived to be controllable by the actor are more mutable than events which are not perceived to be controllable (Girotto, Legrenzi, & Rizzo, 1991; Markman, Gavanski, Sherman, & McMullen, 1995; Reichert & Slate, 2000; Roese, 1997). In a classic study, Girotto, Legrenzi, and Rizzo (1991) had participants read a scenario in which a man returned home after work to find his wife had suffered from a fatal heart attack that could have been prevented had he arrived earlier. When asked to list how the

outcome in the story could have been different, participants were more likely to alter events in the story that were voluntary decisions (e.g., he stopped at the bar to have a drink) as opposed to uncontrollable events (e.g., he had to wait for a flock of sheep to cross the road). Similarly, Markman et al. (1995) found that participants playing a "Wheel of Fortune" game generated counterfactual thoughts that reflected the aspect of the game in which they were given control over, either spinning the wheel or choosing one of two wheels that would determine their fate in the game. Thus, an event for which a person perceives being responsible for is more likely to initiate counterfactual thoughts mutating this action than events for which the person had no perceived control over (Roese, 1997).

In addition to controllability, there is evidence to date that acts of commission (i.e., actions) are more easily mutated than acts of omission (i.e., inactions). For instance, participants rated someone who switched stocks to a different company and lost money (action) as feeling greater regret than someone who if had switched stocks would have gained the same amount of money but did not (inaction; Kahneman & Miller, 1986). Likewise, participants perceived a student who switched classes and received a low grade as having more regret than a student who failed to switch classes (despite considering it) and received a low grade (Landman, 1987). Kahneman and Miller (1986) argued that these results are due to actions that occurred being cognitively easier to imagine altering than inactions that were not carried out. The factor of actions versus inactions being a determinant of counterfactual content is controversial, however. For one, the aforementioned studies utilized comparable methodology and based the "ease" of creating alternatives to events on ratings of perceived regret (N'gbala & Branscombe,

1997). When N'gbala and Branscombe (1997) presented two targets, one who acted and one who failed to act, apart in two scenarios rather than simultaneously in one, there was no significant difference in ratings of regret for the two targets. Moreover, in a second experiment, they found that inactions rather than actions were mutated more when there was no instrumental link between the antecedent and outcome (N'gbala & Branscombe, 1997). Furthermore, Davis et al. (1995) found the opposite effect of these previous studies, such that participants who lost a loved one in a car accident were more likely to focus on their own inactions when producing counterfactual thoughts rather than the actions they took or the behavior of others. Existing research suggests there are several moderators for the action-inaction effect, such as outcome valence (Roese & Olson, 1993) and passage of time (Gilovich & Medvec, 1994). Thus, alluding to actions impacting the content of counterfactual thoughts more so than inactions is overly simplistic in that this effect is dependent on several other aspects of the situation (Roese, 1997).

Finally, a number of other factors have been found to impact the simulation of counterfactual thoughts, though perhaps to a lesser extent. As an illustration, Markman et al. (1993) found that the perceived repeatability of an outcome (e.g., expectation of playing a game multiple times) led to more upward counterfactual thoughts than perceived one-time events. Additionally, temporal order of events also impact counterfactual thoughts. Wells, Taylor, and Turtle (1987) found that events that occur earlier in a sequence of events were altered more than subsequent events. Notably, however, Miller and Gunasegaram (1990) demonstrated the opposite effect: events that occurred later in a sequence of events were mutated more by participants than those that occur earlier. Whether or not the alternative antecedent is salient has also been shown to

impact the production of counterfactual thoughts, especially when a negative outcome has not occurred in order to activate counterfactual thinking spontaneously (Gleicher et al., 1990). Moreover, Petrocelli and Sherman (2010) suggested the greater the amount of detail available for a specific event, the greater evocation of counterfactual thoughts. Hence, there are several different factors that impact the subtype, activation, and content of counterfactual thoughts.

Counterfactual potency. As discussed above, several factors and circumstances influence the generation and frequency of counterfactual thoughts. *Counterfactual potency* goes beyond this characterization of counterfactuals in providing both a qualitative and quantitative context by which the impact and predictive prowess of counterfactual thoughts can be measured (Petrocelli, Percy, Sherman, & Tormala, 2011). Petrocelli et al. (2011) defined counterfactual potency as the interactive effect between two probability judgments, the perceived likelihood of the antecedent (the "if" likelihood; IL) and the perceived likelihood of the counterfactual outcome given the specified antecedent (the "then" likelihood; TL). Hence, in order for counterfactual thoughts to be influential, one must truly believe in the plausibility of the proposed alternative action, as well as the possibility that this alternative antecedent would have actually led to a different outcome. These two components of counterfactual potency, IL and TL, are said to be independent and to exert individual effects; however, the ability of counterfactuals to predict judgments and behavior lies in the combined strength of these components (Petrocelli et al., 2011).

A major implication of counterfactual potency for the counterfactual thinking literature is that it provides a way to actually quantifiably measure the impact of

counterfactual thoughts. This measure of potency consists of having individuals evaluate their counterfactuals separately in terms of their IL and TL components. To measure the IL participants are asked “Consider just the first part of your thought, the ‘IF’ part. What do you perceive was the likelihood of the ‘IF’ part actually occurring?” Participants are then asked, “Now consider the second part of your thought, the ‘THEN’ part of your statement you supplied. Assuming the ‘IF’ part of your thought actually occurred, what do you perceive was the likelihood of the ‘THEN’ part actually occurring?” Participants are asked to answer both of these questions on a 0 to 10 Likert scale where 0 is “not at all likely” and 10 is “extremely likely.” Petrocelli et al. (2011) recommended accounting for the main effects of these two ratings (IL and TL) in addition to the multiplicity of these two ratings, the latter of which is the score for counterfactual potency (CP = IL × TL). Moreover, this measure can be utilized for single counterfactual thoughts, as well as averaged across multiple counterfactual thoughts. Finally, this measure can be used as both as a predictor (or independent variable) and criterion (or dependent variable) for proceeding judgments and affect (Petrocelli et al., 2011).

Petrocell et al. (2011) conducted four studies to validate the construct of counterfactual potency. In the initial study, participants read a scenario about Mr. Jones who experienced a tragic car accident on the way home from work one day. The scenario included several circumstances of Mr. Jones’s day (e.g., stopping along the way to buy ice cream) that could be mutated to change the outcome. Participants were told to list either one, three, or five counterfactual thoughts following the scenario and were primed with the statement “If only Mr. Jones…then this terrible accident might have been avoided.” Finally, participants were asked to judge Mr. Jones on several

responsibility/blame and affect variables. Petrocelli et al. (2011) found that the greater the counterfactual potency, the greater the responsibility/blame and negative affect participants assigned to Mr. Jones. Moreover, despite finding a main effect of thought frequency on counterfactual potency, these results suggested that counterfactual potency significantly predicted these judgments of responsibility/blame and negative affect for both single thoughts and the average of multiple thoughts (Petrocelli et al., 2011). Thus, this initial study provided evidence that counterfactual potency is a reliable predictor of future judgments.

The predictive power of counterfactual potency is further demonstrated in Petrocell et al.'s (2011) proceeding three studies. In Study 2, they demonstrated that the strength of the two components of counterfactual potency, IL and TL, can be successfully manipulated. They found that judgments of responsibility/blame and negative affect were greatest when the strengths of the IL and TL were manipulated to be high as opposed to when either or both components were low. In Study 3, participants generated counterfactual thoughts after reading a scenario in which a couple died in a car accident after being refused a ride from a taxi driver. Participants who were given high correspondence feedback (e.g., told their thoughts were highly similar to those of others) placed more blame on the taxi driver for the death of the couple, and this effect was found to be mediated by counterfactual potency. Thus, the more participants believed their thoughts corresponded to others, the higher their counterfactual potency, and in turn, the greater their judgments of blame (Petrocelli et al., 2011). Finally, Study 4 suggested that counterfactual potency plays a significant role for judgments of regret about one's own decisions. Petrocelli et al. (2011) demonstrated that participants who had higher

counterfactual potency regarding counterfactuals about their decisions in a roulette game expressed greater feelings of regret, whether the outcome of the roulette game was known or unknown (Petrocelli et al., 2011). The combined effects of these four studies, therefore, are suggestive of the predictive ability of counterfactual potency in mediating the impact counterfactual thinking induces on subsequent judgments and expectations.

Counterfactual Viewpoints

As summarized above, research suggests that the perceptual viewpoint people use to simulate such mental activity as memory recall and imagination impacts their meaning-making of such events, and in turn, their subsequent reactions. Moreover, an additional form of mental simulation, namely counterfactual thinking also appears to influence psychological and behavioral reactions to events. Yet, despite the natural marriage of counterfactual thinking and visual perspectives involved in other forms of mental simulation, the existing literature does not address the possibility of counterfactual viewpoints and their potential connection to psychological and behavioral responses. Counterfactual viewpoints can be considered akin to perceptual viewpoints involved in imagination and memory in that people can simulate alternatives to reality from either the field or observer visual perspective. Mentally simulating the counterfactual event from the field counterfactual viewpoint would involve imagining or experiencing the alternative situation from one's own eyes. Imagining an alternative event from the observer counterfactual viewpoint, on the other hand, would entail observing the alternative event from the outside as an observer would.

On the basis of such findings in the perceptual viewpoint and counterfactual thinking literature, several questions can be raised about the role of counterfactual

viewpoints. For example, do factors such as time, emotion, and mental focus impact field and observer counterfactual viewpoints similarly to visual viewpoints involved in imagination and memory? Moreover, do the field and observer counterfactual viewpoints differentially impact the formation of judgments, decision-making, and behavior? Does counterfactual potency have an intervening role on the impact counterfactual viewpoints bestow upon psychological and behavioral responses? Such questions, as well as many more, warrant present and future research on counterfactual viewpoints. The current study seeks to determine whether or not counterfactual viewpoints can be adequately manipulated. Additionally, this study seeks to understand whether the viewpoint one uses to mentally undue his or her past has an impact on his or her future expectations and performance, the topic of which is the focus of the current investigation.

Mental Simulation, Expectancy and Performance

Of interest to the current investigation is the influence mentally undoing the past bestows upon the future, in terms of both expectancies and performance. Expectancies are commonly defined as beliefs an individual has towards the future. Arguably, the main purpose of expectancies is to regulate future behavior. As expressed by Roese and Sherman (2007), “to predict the future is to navigate it more effectively” (p. 91). Existing research suggests the way an event is mentally simulated is influential for future expectancies, as well as for the impact they have in guiding effective performance (e.g., Epstude & Roese, 2008; Kosslyn & Moulton, 2009; Roese & Sherman, 2007; Vasquez & Buehler, 2007).

Mental simulation and expectations. The current literature reveals mental simulation has the ability to influence expectancies about the future, especially in terms

of individuals' perceptions of confidence (or certainty) and likelihood of their occurrence (Carroll, 1978; Koehler, 1991; Roese & Sherman, 2007). The easier it is for an individual to mentally simulate an event sequence, the more confident he or she tends to be in his or her expectation, as well as, the more likely he or she tends to believe the event will occur (i.e., simulation heuristic; Kahneman & Tversky, 1982, Roese & Sherman, 2007). For example, Sherman, Cialdini, Schwartzman, and Reynolds (1985) found that participants who were told to imagine contracting a disease spreading on campus that was described as having relatively common symptoms (e.g., headache, low energy, etc.), rated contracting the disease as easier to imagine as well as more likely to occur. Participants who were given a description of the disease with less common symptoms (e.g., inflamed liver, nervous system malfunction, etc.), on the other hand, reported a more difficult time imagining contracting the disease and expected a lower likelihood of it actually occurring (Sherman et al., 1985). Thus, the easier it is mentally simulate an event, the more likely individuals expected the event to occur.

In explaining this association between ease of mental simulation and perceptions of likelihood, Koehler (1991) argued that mentally simulating events leads one to temporarily treat the hypothesized event as if it were actually true in present time, thereby strengthening one's confidence and judgments of likelihood for the event taking place in the future. This argument is relatively parallel to existing literature on counterfactual thinking, which maintains counterfactual thoughts are essentially casual inferences in which the conditional statement expressed in the counterfactual grants causal meaning for the effect of the antecedent on the actual outcome (Epstude & Roese, 2008; Roese, 1997; Wells & Gavanksi, 1989). For example, if one has the counterfactual thought "If only I

worked out more times this week, then I would have lost some weight," he or she is attributing weight loss to working out. Thus, this counterfactual directly transfers to the expectancy that if he or she were to work out more then he or she would lose weight. Hence, counterfactual thoughts, in essence, are themselves disconfirmed expectancies that impact future expectations, often in the form of predicted affect and behavioral intensions (e.g., Landman, Vandewater, Stewart, & Malley, 1995; Roese, 1994).

In addition, characterizing expectancies by the likelihood of their occurrence corresponds to the mediating role found of counterfactual potency for the impact counterfactual thoughts have on subsequent expectations and predictions. Recall that Petrocelli et al. (2011) found that only when mentally simulated alternatives to reality were viewed as potent, or highly likely to occur, did they impact judgments of blame and expectations for future affect. Similar findings also exist for mental simulation in the form of prefactual thinking, or conditional "if…then" statements expressing alternatives for how a future event is expected to occur before it actually takes place (e.g.,"If only I could set aside more time to study, then I might get a good grade on the final exam;" Sanna, 1996). Thus, prefactual thoughts suggest that if the antecedent was altered (the person actually set aside more time to study, though it is implied that he or she will not), then the anticipated outcome of a good grade will occur. Similar to Petrocelli et al.'s (2011) findings for counterfactual potency, Petrocelli, Seta, and Seta (2012) found that prefactual potency, or the perceived likelihood of the preoutcome alternative, mediates the relationship between prefactual thoughts and predictions of future affect. Specifically, Petrocelli et al. (2012) demonstrated that when participants perceived the likelihood of an optimistic preoutcome alternative to be high, they anticipated feeling more negative

affect compared to when they perceived the preoutcome alternative to be low. Thus, mentally simulating alternatives (counterfactual or prefactual) can greatly impact future expectations, especially when the alternative is perceived to be likely to occur.

Expectations and performance. However they may be characterized, the functional purpose of expectancies lies in their ability to facilitate behavior successfully (Roese & Sherman, 2007). The consensus of the existing literature is that expectancies typically facilitate behavior in line with their composition, such that positive expectancies are typically associated with success and negative expectancies are typically associated with failure (Bandura, 1977a; Carver, Blaney, & Scheier, 1979; Oettingen & Mayer, 2002). In general, individuals have been found to employ more effort and persist longer at tasks for which they expect they will perform well (Carver et al., 1979). For example, Carver et al. (1979) had participants complete an initial anagram task and then manipulated the valance of their expectancies by telling them that people typically either perform better (positive expectancy) or worse (negative expectancy) on the problem task they were about to complete. The results demonstrated that participants who had positive expectations towards the upcoming task performed better and persisted longer at the task, compared to those who had negative expectations. Furthermore, positive self-efficacy expectations have been found to be associated with heightened positive affect and achievement motivation, which in turn fosters successful performance (Bandura, 1977a; Bandura & Locke, 2003; Eden & Aviram, 1993). For instance, Eden and Aviram (1993) demonstrated that unemployed individuals who took part in an intervention designed to increase self-efficacy expectations developed greater motivation, thereby leading to more

job-searching, and in effect reemployment, in comparison to control participants who did not take part in the intervention.

Despite the general consensus that expectancies towards future performance are typically accurate, research also suggests that overly optimistic or inaccurate expectancies can hinder one's ability to successfully confirm these expectancies (e.g., McNulty & Karney, 2004; Oettingen & Mayer, 2002; Roese & Sherman, 2007). Oettingen and Mayer (2002) distinguished between two types of positive futuristic thinking, positive expectations and positive fantasies. Whereas expectations are beliefs about the future based on the perception of likelihood and considerations of past experiences, fantasies are idealized beliefs or images about the future in lieu of considering likelihood and past performance. With four studies, Oettingen and Mayer (2002) demonstrated that positive expectations led to greater displays of effort in pursuing life tasks (e.g., getting a job, preparing for an exam, etc.) and better performance. On the contrary, positive fantasies were associated with poorer displays of effort and performance. Thus, beliefs about the future not derived from accurate perceptions of past performance tend to be overly optimistic thereby obscuring the need to adequately prepare and exert effort in future tasks (Oettingen & Mayer, 2002). Hence, the effect future expectancies have on goal commitment and future performance may be dependent on the accurate reflection of past experience.

Mental simulation and performance. Finally, increasing research attention has also been given to the role of mental simulation in facilitating performance. An impressive amount of the literature on mental simulation and performance has emerged in the field of Sport Psychology. This literature focuses primarily on the effects of mental

practice. Mental practice refers to the imagination or mental rehearsal of the steps involved in performing a task (Driskell, Copper, & Moran, 1994; Kosslyn & Moulton, 2009). Driskell et al. (1994) meta-analysis demonstrated that the general consensus in the literature is that mental practice is effective for improving performance; however, the functioning of mental practice was found to be dependent on several moderators. Specifically, mental practice was found to be most successful when used by experts, when used in combination with physical practice, when used for tasks with cognitive components (e.g., organization and evaluation), and when used for short durations for a short period of time (Driskell, Copper, & Moran, 1994; Kosslyn & Moulton, 2009).

A major mechanism by which mental practice is believed to enhance performance is the altering of knowledge bases stored in memory, thereby making them more accessible when implementing future performance (Kosslyn & Moulton, 2009). Thus, mental practice would be akin to physical practice and would benefit performance only when the content of the rehearsed images is accurate. Consistent with this notion, Pham and Taylor (1999) demonstrated that mental practice focusing on the actual steps to achieve an outcome (i.e., process simulation) enhanced performance more so than focusing on the desired outcome itself (i.e., outcome simulation). Although imagining achieving a desired outcome was associated with higher motivation and expectations to attain it, these images were overly optimistic in that they disregarded the relevant steps needed to aid performance (Pham & Taylor, 1999).

Another circumstance for which the accuracy of mental practice may be impaired is for novel tasks. Novices are unable to formulate accurate images on the basis of prior experience, which does not grant them the ability to improve upon mental representations

and subsequent performance (Ramsey, Cumming, & Edwards, 2009). Despite exerting little effect on actual performance, mental practice by novices can elicit an imagination inflation-type effect (see Gary, Manning, Loftus, & Sherman, 1996) whereby self-efficacy expectancies are inflated. For instance, Ramsey et al. (2009) found that participants who were asked to mentally practice a novel balance task performed worse than those who physically practiced the task and no different from control participants, yet they had much higher performance expectancies before the task than both other groups. Hence, outcomes simulation and mental practice by novices can both be conceptualized as what Oettingen and Mayer (2002) refer to as "fantasies," or idealized images characterized by their overly optimistic and inaccurate performance expectations.

Similar to visual viewpoints involved in memory recall and imagination previously reviewed, research on mental practice distinguishes between internal (i.e., field) and external (i.e., observer) imagery. Which of the two visual perspectives leads to better performance is unclear, though most scholars agree that the answer is both function and task-dependent (e.g., Callow, Ross, Hardy, Jiang, & Edwards, 2013; Fournier, Deremaux, & Bernier, 2007; Hardy & Callow, 1999; White & Hardy, 1995). Because the observer viewpoint portrays a relatively detached image of oneself, it grants the perceiver a comparative model for which to imitate in future performance (e.g., observational learning; Bandura, 1977b). Thus, mental practice from the observer viewpoint has been deemed beneficial for tasks that involve shape and form, such as gymnastics (White & Hardy, 1995) and karate (Hardy & Callow, 1999). The field visual viewpoint, on the other hand, permits the individual to be more in tune with the component processes and concrete details involved in a task. Therefore, the field viewpoint appears to be more

effective for tasks in which successful performance depends on body position, complex movements, and modification, such as golf (Bernier & Fournier, 2010), driving, and slalom skiing (Callow et al., 2013).

Interestingly, a trade-off between accuracy and motivation has been found for the two imagery viewpoints for mental practice (Callow et al., 2013; White & Hardy, 1995). The field viewpoint, on one hand, has been associated with more accurate simulation and performance of a task, likely due to its simulation of the event from the same perspective that the actual experience occurs. In maintaining the original perspective, individuals are able to focus more on the concrete details of the event which more closely corresponds to actual physical practice. Mental practice via the observer viewpoint, on the contrary, has been found to enhance motivation to a greater extent than the field viewpoint (Callow et al., 2013; White & Hardy, 1995). This finding is consistent with Vasquez and Buehler's (2007) aforementioned finding that the observer imagery perspective was associated with greater achievement motivation.[1] The notion that the observer perspective leads to greater motivation may be due to its broader focus on the significance of the event, in addition to the self-competition and confidence derived from comparing oneself to an even better version of oneself (Callow et al., 2013; Vasquez & Buehler, 2007; White & Hardy, 1995). Notably, these studies did not directly assess whether the increased motivation derived from the observer viewpoint actually yields better performance.

To end, mental simulation in the form of counterfactual thinking has also been found to be effective for performance. To the extent that reflecting on an alternative

[1] Some caution should be taken when applying findings for mental practice imagery viewpoints to visual viewpoints involved in other types of mental simulation. Unlike true visual viewpoints, imagery viewpoints involved in mental practice are often conflated with other forms of imagery (e.g., kinesthetic, auditory, spatial, etc.; Callow et al., 2013; Kosslyn & Moulton, 2009)

outcome leads to insights of corrective behaviors that could improve upon the outcome in the future, counterfactual thinking serves as a preparatory and functional process (Epstude & Roese, 2008). For example, Nasco and Marsh (1999) found that college students who listed upward counterfactual thoughts the day after receiving an exam grade reported having a greater change in their circumstances (e.g., came to class more often) the day before their next exam, as well as greater self-perceived control, which in turn was correlated with better performance on a second exam. Similarly, Reichert and Slate (2000) found that participants who simulated upward counterfactual thoughts after receiving feedback on a computerized anagram task improved their performance on a second anagram task. Yet, as has been general trend for literature involving mental simulation and performance, recent research suggests that in some cases counterfactual thinking can also be dysfunctional for learning and performance. By deterring attention from the reality of what actually occurred for a focus on ideal alternatives, counterfactuals can bias memory, inflate confidence, and prime illusions of control. In effect, these biases can hinder one's ability to successfully learn and perform tasks (Petrocelli & Harris, 2011; Petrocelli, Seta, & Seta, 2013; Petrocelli, Seta, Seta, & Prince, 2012; Sherman & McConnell, 1995).

Collectively, the research discussed in this section suggests that mentally simulating an event influences subsequent expectations and behavior. Additionally, the existing literature reveals that expectations derived from mental simulation are beneficial for performance so long as they are accurate; yet, they can hinder performance if optimistically biased or inaccurate (e.g., Epstude & Roese, 2008; Kosslyn & Moulton, 2009; Oettingen & Mayer, 2002; Roese &Sherman, 2007; Sherman & McConnell, 1995).

Consensus for whether or not the field or observer visual perspective is associated with greater future expectations and performance, however, is less distinguished (e.g., Callow et al., 2013; Fournier et al., 2007; Vasquez & Buehler, 2007; White & Hardy, 1995). Additionally, the literature does not acknowledge counterfactual viewpoints and whether or not the visual viewpoint one takes to undo past events (as opposed to recalling the past or imagining the future) impacts subsequent reactions.

An initial correlational study conducted by Thomas and Petrocelli (2014) sought to examine the differential role of the proposed construct of counterfactual viewpoints for counterfactual potency and future performance expectancy. Specially, their participants simulated upward counterfactual thoughts about their performance in a Blackjack game, after which, they reported their counterfactual viewpoint, counterfactual potency, and future performance expectancy. Consistent with earlier findings that suggested differential effects on performance due to differing levels of task knowledge (e.g., Ramsey et al., 2009), Thomas and Petrocelli's (2014) results revealed that the impact of counterfactual viewpoint on counterfactual potency was dependent on Blackjack knowledge. Participants with high Blackjack knowledge who utilized the observer perspective perceived the likelihood of their counterfactual thought as greater, and in turn, had greater optimism for future performance. The current investigation seeks to extend the work of Thomas and Petrocelli (2014) by manipulating the counterfactual viewpoint participants use to simulate their counterfactuals, as well as by testing the effect of these variables on actual performance.

The Present Study

The current study served to evaluate whether counterfactual thoughts following an initial performance influence judgments for future performance differently depending on whether these thoughts are initiated from the field or observer counterfactual viewpoint, as well as whether this proposed effect is mediated by counterfactual potency. An additional goal of the current study was to determine which of the two counterfactual viewpoints leads to a greater change in actual performance and whether this effect is directly linked to either participants' performance expectancies or counterfactual potency.

Participants were asked play a Ping Pong game, after which they were asked to simulate an upward counterfactual thought for how they could have performed better in the game than they actually performed from either the field or observer counterfactual viewpoint. Participants were then asked to rate the perceived likelihood (i.e., counterfactual potency) of their counterfactual thought and their perceptions of ability, and to judge how they expected to perform on future trials of the Ping Pong game. Finally, in order to evaluate improvements in performance and task persistence, participants were asked to play the game a second time.

Previous research suggests that the field and observer visual perspectives differentially impact affective, cognitive, and behavioral responses (e.g., Callow et al., 2013; Libby et al., 2007; Vasquez & Buehler, 2007; White & Hardy, 1995). Thus, it can be expected that the two counterfactual viewpoints will also differentially influence the impact counterfactual thoughts have on resulting reactions. Recent research also suggests that counterfactual potency, or the perceived likelihood of counterfactual alternatives to reality, influences the strength of the link between counterfactual thinking and subsequent

reactions (Petrocelli et al., 2011). Therefore, it can be assumed that counterfactual potency will also mediate the effect counterfactual viewpoint has on succeeding responses.

Importantly, past research reveals that being knowledgeable about a particular domain of relevance results in more potent counterfactual thoughts (e.g., Mandel & Lehman, 1996; Sobel, 2011). Furthermore, Thomas and Petrocelli (2014) found that counterfactual potency mediated the interactive effect of knowledge of Blackjack and counterfactual viewpoint on performance expectancy. On the basis of such findings, counterfactual viewpoint is expected to influence counterfactual potency only under conditions in which participants perceive themselves to be highly competent in the domain. Additionally, because expectancies are believed to be tied directly to the perceived likelihood of future events (e.g., Koehler, 1991; Roese & Sherman, 2007), it can be assumed that higher counterfactual potency will be associated with better performance expectancies. Thus, in keeping with Thomas and Petrocelli (2014), counterfactual viewpoint, in interaction with domain-specific ability, is expected to influence performance expectancies indirectly through counterfactual potency.

Taken together, it is hypothesized that when perceived ability for the Ping Pong game is high, participants who were instructed to simulate their counterfactual thought from the observer counterfactual viewpoint will have greater counterfactual potency in comparison to participants with high perceived ability in the field viewpoint condition. In turn, this greater counterfactual potency is expected to result in more optimistic expectancies for future performance. Explanations for the proposed hypothesis can be derived from recent research in the visual viewpoint and expectancy literature. For one,

comparing reality to a better version of one's self from the observer counterfactual viewpoint may lead participants to attribute their performance more to personal faults rather than to situational aspects (e.g., Frank & Gilovich, 1989). By granting less weight to the contextual features of the game, participants may foster an illusion of control implying their performance can be improved by changing their own actions alone. Notably, perceived personal control over the outcome of an event is one factor that has been found to impact the strength of counterfactual thoughts (e.g., Girotto et al., 1991; Markman et al., 1995; Reicht & Slate, 2000). In effect, this greater sense of control derived from the observer perspective may lead participants' to perceive the likelihood of their counterfactual thoughts as greater, and in turn report more optimistic expectancies for future performance.

An alternative, although not necessary incompatible, explanation for the proposed effect of the observer viewpoint on counterfactual potency and performance expectancy can be derived from Libby and Eibach's (2011) meaning-making model. This model suggests that the observer perspective is characteristic of a conceptual mind-set activating abstract construals such as personal beliefs, goals, and traits. The field perspective, on the other hand, is said to elicit an experiential mindset activating more concrete construals such as discrete actions, specific experiences, and incidental features of the event itself. Because the observer perspective is associated with construing events more in line with an individual's specific goals and traits, it has been found to foster the motivation and intention to pursue the imagined action (e.g., Libby et al., 2007; Vasquez & Buehler, 2007; White & Hardy, 1995). Thus, focusing precisely on the goal of performing better may facilitate one's perceived likelihood and expectation of actually performing better

more so than simply focusing on the concrete and incidental features of the counterfactual outcome (e.g., Pham & Taylor, 1999).

Whether or not the observer or field counterfactual viewpoint will actually lead to a greater change in performance is less straightforward. The consensus of the existing literature is that expectancies typically facilitate behavior in line with the composition of these expectancies (Oettingen & Mayer, 2002; Roese & Sherman, 2007). Moreover, individuals have been found to employ more effort and persist longer at tasks for which they expect they will perform well (Carver et al., 1979). Thus, it can be hypothesized that those who have more optimistic performance expectancies should, therefore, actually perform better and persist longer in a future performance. Since participants who have high domain-specific ability and utilize the observer counterfactual viewpoint are expected to have greater expectancies for future performance via counterfactual potency, it is reasonable to also hypothesize that these individuals will actually show greater improvement and persist longer in their final performance (either via heightened performance expectancy or counterfactual potency).

Yet, recent research also suggests that overly optimistic or inaccurate expectancies can hinder one's ability to successfully confirm these expectancies (e.g., McNulty & Karney, 2004; Oettingen & Mayer, 2002; Roese & Sherman, 2007). Attribution theory research is replete with examples of how observers often ignore, discount, or fail to correct for, situational factors when they explain or predict the behaviors of others (see Jones, 1990; Ross, 1997), and there is little reason to not expect them to do so when they consider their own experiences from the perspective of an observer. Actors, on the contrary, are more attune to relevant situational features allowing

them to correct for these factors when explaining and predicting behavior. Thus, in comparison to an outside perspective, seeing the event from one's own eyes may elicit more accurate depictions of events due to a greater focus on situational features, as well as, a less reconstructed view of reality (e.g., Callow et al., 2013; Nigro & Neisser, 1983; Robinson & Swanson, 1993; White & Hardy, 1995).

Additionally, recent research for mental simulation in the form of mental practice is also suggestive that the field viewpoint may be more beneficial for performance. Although outcome simulation (i.e., imagination focused on the outcome goal) has been associated with heightened motivation, process simulation (i.e., imagination focused on the steps of a performance) has been associated with better performance (Pham & Taylor, 1999). Outcome simulation has been found to elicit inaccurate and overly optimistic expectations for performance that overestimate the effort needed to perform well on a task (e.g., fantasies, Oettingen & Mayer, 2002). Process simulation's regard for the actual course of action needed to perform well, on the other hand, more accurately mimics physical practice and in effect has been found to be more beneficial for performance (Pham & Taylor, 1999). Since the observer perspective elicits a more goal-oriented and conceptual mindset, it may be more akin to outcome simulation. In contrast, the field perspective's experiential focus on specific details and discrete actions may be more consistent with process simulation. Thus, these findings suggest that the field counterfactual viewpoint may actually lead to better performance even if the observer viewpoint produces greater counterfactual potency and performance expectations. To the extent that performance is enhanced only when mental representations are accurate (e.g.,

Epstude & Roese, 2009; Kosslyn & Moulton, 2009), the overly optimistic expectancies evoked from the observer perspective may actually hinder performance.

In summary, the present study seeks to determine the impact counterfactual viewpoint has on succeeding counterfactual potency, performance expectancy, and actual performance. It is hypothesized that those who have high domain-specific ability and are instructed to take the observer counterfactual viewpoint will perceive the likelihood of their counterfactual thoughts as greater, and in turn, have greater optimism for future performance. There are reasons to suspect that a counterfactual observer viewpoint and a counterfactual field viewpoint may lead to greater persistence and performance, and thus two contrasting hypotheses are proposed. The observer viewpoint may lead to greater performance by way of eliciting more optimistic expectancies or greater counterfactual potency (*observer-performance hypotheses*). The field viewpoint, on the other hand, may have a direct benefit on performance due to more elaborative and accurate mental practice (*field-performance hypothesis*). The current study was designed to examine such possibilities.

METHOD

Participants

A total of 129 (64.34% female) Wake Forest University undergraduate students participated in the study. Participant ages ranged from 17-22 years old, with the mean age being 18.88 (*SD* = .96). Of the total sample, 69.80% were freshmen, 18.60% were sophomores, 10.10% were juniors, and 1.60% were seniors. All of the participants were recruited through the online Wake Forest University participant pool. Each participant signed an informed consent form to participate in a 30-minute research session and received partial course credit for their participation.

Design

This study utilized a between-subjects experimental design in which participants were randomly assigned to one of two Counterfactual Viewpoint conditions, the field condition (n = 65) or the observer condition (n = 64). The research assistant administering the study was blind to the condition for which each participant was assigned.

Procedure

Phase 1. The first phase of the study served as an orientation to the Ping Pong game. Upon arrival, three participants were greeted by a research assistant who led them into a conference room where a consent form was laid out on each of three desks along with a "Task Scoring Sheet" turned-over (see Appendix A). The research assistant then provided a brief oral introduction to the experiment, which was described as one concerned with "viewpoints of daily activities that one may think about." After signing the consent form and agreeing to participate, the research assistant informed the

participants that they would be playing a game that tested their hand, eye coordination skills. The participants were then asked to turn over the "Task Scoring Sheet" and review the instructions for the Ping Pong game they were about to play (see Appendix A).

Initial Ping Pong game. The Ping Pong game consisted of three lanes of three vertical plastic cups lined up on a conference table. The object of the game was to score as many points as possible by tossing the Ping Pong balls into the cups. Each cup was worth a certain number of points depending on its location on the table: the closer of the three cups was worth one point, the second was worth two points, and the cup farthest away was worth three points. Participants were allowed to use any method to get the ball into the cup, as long as they remained behind the table and used only the cups in their specified lane. A total of four trials were played during the initial game, two practice trials and two scored trials. Each trial consisted of six shots, and participants' score for each trial played was the sum of their points for the six shots. Thus, the total possible score for a single trial was 18 points. Participants were instructed to calculate and write down their score for each of the scored trials in the blanks provided on the "Task Scoring Sheet" (see Appendix A). They were asked to hold on to this sheet for the remainder of the experiment.

Phase 2. After participants completed the two scored trials of the Ping Pong game, they were led by the research assistant to private cubicles equipped with a desktop computer to complete the second phase of the study individually. MediaLab v2012 Research Software (Jarvis, 2012) was used to present the materials to the participants. A preliminary screen frame welcomed participants to the study and reminded them to read the instructions very carefully in order to know what to do during their participation.

Participants were permitted to progress at their own pace throughout the study and advance to each section of the study using the computer mouse.

Initial score. Participants were first asked to think about the highest score they obtained on the two scored trials of the Ping Pong game and to record their highest score in the boxes provided. This score was presented to participants frequently throughout the experimental session in order to make their initial performance salient. The generation of counterfactual thoughts is associated with failure or undesirable outcomes (e.g., Roese & Olson, 1997; Sanna & Turley, 1996), thus, initial score was used as a control measure for all subsequent analyses.

***Counterfactual viewpoint manipulation*.** Next, participants were asked to simulate an upward counterfactual thought by thinking about their score and how they could have performed better than they actually performed. The following instructions were presented to participants:

> Now we would like you to think about how you could have performed better than you actually performed on the Ping Pong game. Specifically, for the next few moments (i.e., two minutes) we would like you to think of an alternative to your actual performance. That is, think about how you might have performed better than (scored greater than) X.

Participants were then given one of two different instructions for how to proceed with their mental simulation depending on whether they were randomly assigned to the field or observer Counterfactual Viewpoint condition (adapted from Libby & Eibach, 2011). Participants randomly assigned to the field condition were provided the following instructions:

> Specifically, we would like you to imagine how you could have performed better than you actually performed on the Ping Pong game from the FIELD viewpoint, or "first-person perspective." With the FIELD perspective you should imagine the scene from the same visual perspective you would if you were actually performing the alternative action. That is, when imagining performing better, you are looking through your own eyes at the situation and your surroundings as you perform the alternative.

Participants assigned to the observer condition, on the other hand, were provided the following instructions:

> Specifically, we would like you to imagine how you could have performed better than you actually performed on the Ping Pong game from the OBSERVER viewpoint, or "third-person perspective." With the OBSERVER perspective you should imagine the scene from the visual perspective an observer would have if you were actually performing the alternative action. That is, when imagining performing better, you can see yourself performing the alternative from the outside, as if you were watching a video of yourself in the situation.

In order to ensure that participants were actively thinking about how they could have performed better on the Ping Pong game, participants were not given the opportunity to move to the next screen frame until a full two minutes had elapsed. Participants were not forced to progress after the two minutes, however, and were permitted to click 'continue' when they felt they were adequately prepared to summarize their thoughts.

Manipulation bolster questions. In both conditions, the viewpoint manipulation instructions were followed by a set of four questions intended to facilitate the participants' mental simulation from either the field or the observer viewpoint (adapted from Libby, Eibach, & Gilovich, 2005). Participants were asked to continue imagining how they could have performed better than they actually performed on the Ping Pong game and to consult this image when answering the questions. The four questions for the field condition were as follows:

1. Can you see the Ping Pong game set up on the table?
2. Can you see your hands aiming the ping pong balls at the cups?
3. Can you see the ping pong ball going into the cup?
4. Can you see anyone else in the room?

Participants in the observer condition received the four following questions instead:

1. Can you see what you are wearing?
2. Can you see what your facial expression is?
3. Can you see whether you are standing or sitting?
4. Can you see yourself playing the Ping Pong game?

All of the questions for both conditions were measured on a 10-point Likert scale, using "NOT AT ALL (1)," "MODERATELY (5)," and "COMPLETELY (10)" as the anchor labels.

Upward counterfactual thought-listing task. After participants responded to the four manipulation bolster questions, they were then asked to summarize their thoughts for how they could have performed better on the Ping Pong game. Specifically, the following instructions were presented to participants:

In the box below we want you to write a brief statement that summarizes your thoughts. Because we asked you to think about alternatives and how you may have performed better, we would like you to begin your statement with the words "IF ONLY…"

The thought listed by the participant served as the counterfactual thought to be evaluated in the Counterfactual Potency and manipulation check measures.

Counterfactual potency. Following the counterfactual thought simulation, participants were asked to complete a measure of counterfactual potency intended to evaluate the perceived likelihood of their counterfactual thoughts (Petrocelli et al., 2011). The perceived likelihood of their counterfactual thought statement was divided into two parts: the "if only" or antecedent of the counterfactual, and the "then" or alternative outcome. Consistent with the methods of Petrocelli et al. (2011), participants were first provided with an example of a scenario in which a doctor decides between two treatments and the patient ultimately dies. Using this doctor scenario, an illustration of a counterfactual thought he might have had was given, as well as a demonstration of judging the likelihood of the "IF" and "THEN" components of the counterfactual thought (see Appendix B). Participants were then presented with the counterfactual thought they simulated previously and were asked to rate the likelihood of each part of their thought on a scale using "NOT AT ALL likely (0)" and "EXTREMELY likely (10)" as the anchor labels (see Appendix B for specific counterfactual potency measures). Counterfactual Potency was calculated by multiplying participants' rating of likelihood for their "IF statement" by the likelihood rating of their "THEN statement" (Petrocelli et al., 2011). Therefore, scores on this variable could range from 0-100.

***Domain-specific ability*.** Following the counterfactual potency measure, participants were asked two questions pertaining to their perceived ability in the Ping Pong game. Importantly, both of these questions were asked without participants knowing that they would soon be playing the game again. First, participants were asked "If you were given the opportunity to play the Ping Pong game again for another credit, how do you think you would perform?" This question was rated on a nine-point Likert scale using "much WORSE (1)" and "much BETTER (9)" as the anchor labels. Succeeding this question, participants were reminded of their initial score on the Ping Pong game and asked, "Your high score on the Ping Pong game was X. What do you think it would be if we asked you to play the game again?" Participants were instructed to place a score between 0-18 into the boxes provided.

Existing research suggests that participants who are more knowledgeable or skilled in a certain domain will produce stronger and more accurate counterfactuals (see Mandel & Lehman, 1996; Sobel, 2011). Thus, a composite variable was computed using the two aforementioned questions, as well as participants' initial score, to determine participants' domain-specific ability. This proposed moderating variable was believed to be conceptually aligned with the "knowledge" variable used by Thomas and Petrocelli (2014), which moderated the relationship between counterfactual viewpoint and performance expectations. In calculating this variable, participants' actual score in the initial trial of the Ping Pong game was subtracted from their perceived score on a hypothetical future Ping Pong game (DA Question 2). This difference was then *Z*-scored and added to participants' *Z*-score for their answer to how much better or worse they perceived they would perform on a hypothetical future Ping Pong game (DA Question 1).

Thus, Domain-Specific Ability was calculated in the following way: Domain-Specific Ability = $Z_{\text{DA Question 2 – Initial Score}} + Z_{\text{DA Question 1}}$, such that higher scores on this variable conveyed more perceived ability in the Ping Pong game and lower scores represented less perceived ability.

Future performance expectancy. After the domain-specific ability questions, participants were informed that they would soon be returning to the conference room to play the Ping Pong game again and were asked a question about how they expected to perform on future trials of the game. Specifically, participants were asked "How confident are you at performing better in the Ping Pong game than you performed earlier?" This question was rated on a nine-point scale, using "NOT AT ALL confident (1)" and "EXTREMELY confident (9)" as the anchor labels. This Performance Expectancy measure served as a main criterion variable in subsequent analyses.

Demographics. In the last part of the second phase of the study, participants were asked to respond to demographic questions, reporting their gender, age, year in college, and whether or not they were a Psychology major.

Phase 3. At the conclusion of the demographic questions, participants were informed that they should leave their cubicle and report to the conference room with their "Task Scoring Sheet." The Ping Pong game was again set up on the conference table, and two sheets, one with manipulation check questions and one a debriefing form, were turned over and placed on the three individual desks. Participants were asked to return to their desk and wait quietly until all participants had finished the second phase of the study and had returned to the conference room.

Final performance. Once all participants returned to the conference room, the research assistant informed them that they would be playing two additional trials of the Ping Pong game. Although all participants were asked to complete at least two trials, they were also told that they were permitted to complete up to five additional trials of the game. Participants were instructed to use the back of their "Task Scoring Sheet" to write down the scores for all of the trials they chose to complete. Specific instructions for how to record the scores for each trial were presented by the research assistant. The highest score obtained by each participant, out of 18 total possible points, in the trials completed was manually recorded as his or her final performance score. Thus, this second phase of the Ping Pong game served as both a performance measure as well as a persistence measure (out of five trials).

***Manipulation check questions*.** Participants were instructed to complete the face-down questionnaire after they finished playing the game. They were asked to transcribe their participant number listed on the top of their "Task Scoring Sheet" to the top of the questionnaire. On this questionnaire were three manipulation check questions to confirm that the manipulation worked and participants instructed to use the field viewpoint or the observer viewpoint rightfully did so. Participants were first informed that when people mentally simulate alternatives to reality (e.g., thinking about how things could have turned out better than they actually did), as they were instructed to do, they tend to do so from one of two different perceptual viewpoints, namely the field and observer viewpoints. Participants were then provided with a definition of both the field and observer visual viewpoints in order to ensure that they had an understanding of both

viewpoints. The field and observer visual viewpoints were defined for participants in the following way (adapted from Nigro & Neisser, 1983):

> One of these viewpoints is called the FIELD viewpoint. The field viewpoint involves picturing/imagining the event from the "first-person perspective." That is, with the field perspective you are mentally simulating the situation and your surroundings as if you are experiencing the alternative event and looking through your own eyes.
>
> The other viewpoint is called the OBSERVER viewpoint. The observer viewpoint involves picturing/imagining the event from the "third-person perspective." That is, with the observer perspective you are mentally simulating the situation and your surroundings as if you are observing the alternative event from the outside as an observer would.

Following the two definitions, participants were first asked to think back to their alternative for how they could have performed better on the Ping Pong game and rate the extent to which they simulated this thought from the field viewpoint versus the observer viewpoint (MC-bipolar). Specifically, they were asked to answer the following question on a nine-point Likert scale, using "ENTIRELY field perspective (1)" and "ENTIRELY observer perspective (2)" as the anchor labels:

> "When we asked you to think about how you could have performed better than you actually performed, to what degree would you say that you used the FIELD viewpoint versus the OBSERVER viewpoint?"

Thus, higher scores on this question indicated participants used the observer perspective more and lower scores indicated participants used the field perspective more.

Next, the participants were asked to rate the extent to which they simulated their alternative thought separately for the two different viewpoints (MC-Field and MC-Observer). Specifically, they were asked to rate the two viewpoints in the following way:

> "When we asked you to think about how you could have performed better than you actually performed, to what degree would you say that you used the FIELD/OBSERVER viewpoint to mentally simulate the alternative?"

Both questions were rated on a nine-point Likert scale, using "NOT AT ALL field perspective/observer perspective (1)" and "EXTREMELY field/observer perspective (9)" as the anchor labels.

Cross-talk prevention and debriefing. At the conclusion of the manipulation check questions, participants were asked to respond to a Participant Crosstalk Prevention message (although no consequences were applied if participants responded "no"; see Edlund, Sagarin, Skowronski, Johnson, & Kutter, 2009), and were debriefed about the purpose of the study and dismissed. Participants were instructed to leave all study materials in the conference room for the research assistant to collect.

RESULTS

Manipulation Check

In order to determine if the counterfactual viewpoint manipulation was successful, a mixed analysis of variance (ANOVA) was computed using the individual manipulation check questions (MC-Field vs. MC-Observer) as the within-subjects factor and Counterfactual Viewpoint condition as the between-subjects factor. The main effect of condition was not found to be statistically significant, $F(1, 127) = .32$, *ns*. There was, however, a significant main effect of the Manipulation Check Question, $F(1, 127) = 27.23$, $p < .001$. Overall, the sample rated the MC-Field question ($M = 5.99$, $SD = 2.09$) significantly greater than the MC-Observer question ($M = 4.22$, $SD = 2.32$). This main effect, however, was qualified by a significant Manipulation Check Question × Counterfactual Viewpoint condition interaction, $F(1, 127) = 11.95$, $p = .001$. As expected, tests of simple effects revealed that when answering the MC-Field question, participants in the field condition ($M = 6.52$, $SD = 2.01$) rated their viewpoint as significantly more field than those in the observer condition ($M = 5.45$, $SD = 2.05$), $t(127) = 2.25$, $p < .05$. On the other hand, when answering the MC-Observer question, participants in the observer condition ($M = 4.86$, $SD = 2.20$) rated their viewpoint as significantly more observer than those in the field condition ($M = 3.60$, $SD = 2.28$), $t(127) = -2.64$, $p < .05$.

As an additional confirmation that the manipulation check had its intended effect, a one-way ANOVA was computed using the MC-bipolar question. Recall that higher scores on this measure indicated participants simulated their counterfactual thought as more in line with the observer perspective and lower scores indicated participants simulated their counterfactual thought as more in accordance with the field perspective.

As expected, the analysis yielded a significant mean difference, such that participants in the observer condition (M = 5.06, SD = 2.29) rated the question significantly greater (more observer) than those in the field condition (M = 3.31, SD = 2.05), $F(1, 127)$ = 20.96, $p < .001$.

Descriptive Statistics and Effect of Counterfactual Viewpoint

A series of one-way analysis of covariance (ANCOVA) tests were computed to examine the differential effect of the field and observer Counterfactual Viewpoint conditions on the main study variables (i.e., Counterfactual Potency, Domain-Specific Ability, Performance Expectancy, Final Score, and Persistence). Additionally, a mixed ANOVA was used to determine whether there was a difference between the two counterfactual viewpoints for Performance Change. The descriptives for all of the study variables were calculated and are displayed in Table I, as well as partial intercorrelations between the variables.

Participants' Initial Score on the Ping Pong game served as a covariate in all subsequent analyses (excluding those involving Performance Change).[2] Initial Scores on the Ping Pong game (i.e., highest score achieved on the first two scored trials) were highly variable with a range from 0 to 15 points and a mean of 6.71 points (SD = 3.55) out of 18 total possible points. In order to rule out any initial differences between the two Counterfactual Viewpoint conditions in Initial Score, a preliminary one-way ANOVA was conducted. As anticipated, participants assigned to the field counterfactual viewpoint condition (M = 6.52, SD = 3.45) did not differ from those assigned to the observer counterfactual viewpoint condition (M = 6.89, SD = 3.66), $F(1, 127) = .35$, *ns*. Thus, any initial difference between the two groups in terms of ability can be dismissed.

[2] The conclusions for all analyses were the same with or without adding the covariate Initial Score.

Table I

Sample Descriptives and Partial Intercorrelations Controlling for Initial Score.

Variable	1	2	3	4	5	*M*	*SD*
1. Counterfactual Viewpoint[a]	–						
2. Counterfactual Potency[b]	.02	–				40.04	21.46
3. Domain-Specific Ability[c]	-.05	.31***	–			.00	1.74
4. Performance Expectancy	-.07	.46***	.43***	–		5.53	1.52
5. Final Score	-.20*	.07	.21*	.24**	–	8.96	3.91
6. Persistence	.03	.13	.07	.03	.19*	3.72	1.24

Note. [a]Field = 0; Observer = 1 [b]If likelihood × Then likelihood.

[c]Domain-Specific Ability = $Z_{\text{DA Question 2 – Initial Score}} + Z_{\text{DA Question 1}}$

*$p < .05$. **$p < .01$. ***$p < .001$.

Counterfactual potency. As aforementioned, participants' Counterfactual Potency was calculated by multiplying their rating of likelihood for their "IF statement" by the likelihood rating of their "THEN statement" (Petrocelli et al., 2011), creating a range from 0-100. On average, Counterfactual Potency scores fell on the lower half of the scale ($M = 40.04$, $SD = 21.46$). As predicted, when controlling for Initial Score, participants in the field condition (adjusted $M = 39.68$, $SE = 2.68$) did not report significantly different Counterfactual Potency compared to those in the observer condition (adjusted $M = 40.40$, $SE = 2.70$), $F(1, 126) = .04$, *ns*.

Domain-specific ability. Participants' Domain-Specific Ability ($Z_{\text{DA Question 2 – Initial Score}} + Z_{\text{DA Question 1}}$) ranged from -6.16 to 5.34 ($M = .00$, $SD = 1.74$). The covariate effect of Initial Score on Domain-Specific Ability was statistically significant, $F(1, 126) = 7.00$, $p = .01$, such that Domain-Specific Ability increased as Initial Score increased.

Domain-Specific Ability, however, was not found to significantly differ between those in the field condition (adjusted M = .08, SE = .21) and those in the observer condition (adjusted M = -.08, SE = .21), $F(1, 126) = .28$, *ns*. Thus, Domain-specific ability was not determined by counterfactual viewpoint.

Performance expectancy. After being informed they would be playing the Ping Pong game a second time, participants expected, on average, to perform slightly better than they had performed previously (M = 5.53, SD = 1.52). As hypothesized, when controlling for Initial Score, no significant direct effect of Counterfactual Viewpoint condition was found on Performance Expectancy, $F(1, 126) = .631$, *ns*. Participants' confidence for how they would perform on the next trials of the game in the field condition (adjusted M = 5.63, SE = .19) was not significantly different from participants confidence in the observer condition (adjusted M = 5.42, SE = .19).

Final score. Participants' Final Score, in terms of the highest score they achieved on all of the trials they chose to play, ranged from 0-18 (M = 8.96, SD = 3.91). The covariate effect of Initial Score on Final Score was statistically significant, $F(1, 126) = 91.01$, $p < .001$, such that Final Score increased as Initial Score increased, $r(127) = .64$. In addition, a significant effect of Counterfactual Viewpoint condition was obtained, $F(1, 126) = 5.36$, $p = .02$. Interestingly, participants assigned to the field condition (adjusted M = 9.56, SE = .37) performed significantly better than those assigned to the observer condition (adjusted M = 8.35, SE = .37). Thus, this finding provided evidence for the field-performance hypothesis.

Persistence. On average participants played 3.72 (SD = 1.24) final trials of the Ping Pong game out of five possible trials. Neither the covariate effect of Initial score,

$F(1, 126) = 1.58$, *ns*, nor the effect of condition, $F(1, 126) = .12$, *ns*, on persistence was found to be statistically significant. Contrary to expectations, participants assigned to the field condition (adjusted $M = 3.68$, $SE = .15$) did not persist significantly more or less than those assigned to the observer condition (adjusted $M = 3.76$, $SE = .16$).

Performance change. Finally, in order to determine whether there was a difference between the Counterfactual Viewpoint conditions on Performance Change, a mixed analysis of variance (ANOVA) was computed using Initial Score and Final Score as the within-subjects factor and Counterfactual Viewpoint condition as the between-subjects factor. The main effect of condition was not found to be statistically significant, $F(1, 127) = .25$, *ns*. There was, however, a significant main effect of Performance Change, $F(1, 127) = 66.88$, $p < .001$. As should be expected, the sample displayed an overall practice effect, such that participants' Final Scores ($M = 8.96$, $SD = 3.91$) were significantly greater than their Initial Scores ($M = 6.71$, $SD = 3.55$) on the Ping Pong game. Notably, there was also a significant Counterfactual Viewpoint condition × Performance Change interaction, $F(1, 127) = 5.70$, $p = .02$. Tests of simple effects revealed that participants in the observer condition performed significantly better in the final trials of the game ($M = 8.48$, $SD = 4.11$) than they did in the initial trials of the game ($M = 6.89$, $SD = 3.66$), $t(127) = -4.07$, $p < .001$. The observed practice effect was even stronger for participants in the field condition, however, suggesting an even greater significant difference between their Final Score ($M = 9.43$, $SD = 3.68$) and their Initial Score ($M = 6.52$, $SD = 3.45$), $t(127) = -7.51$, $p < .001$. Hence, this finding provided additional support for the field-performance hypothesis.

Partial Intercorrelations

In addition to determining the influence of Counterfactual Viewpoint condition on the different study variables, partial intercorrelations were computed to examine the associations between all of the main study variables. Like the ANCOVA analyses, all of the partial intercorrelations controlled for participants' Initial Score (see Table I).

As hypothesized, Counterfactual Potency was found to be significantly related to Domain-Specific Ability, such that higher Domain-Specific Ability was associated with higher Counterfactual Potency. Similarly, Counterfactual Potency was found to be strongly correlated with Performance Expectancy, such that greater Performance Expectancy was associated with greater perceived likelihood of a counterfactual alternative. Performance Expectancy and Domain-Specific Ability were also significantly related to one another; greater Domain-Specific Ability was found to be positively associated with a better future Performance Expectancy.

Moreover, participants' Final Score was found to be significantly related to several of the study variables, including Domain-Specific Ability, Performance Expectancy, and Persistence. As expected, participants who had greater Domain-Specific Ability performed better on the final performance of the Ping Pong game, as did those who had a greater expectation for their future performance. Finally, Persistence was positively associated with Final Score, such that those who completed more trials of the game in the final phase tended to have higher final scores. None of the other partial correlations approached significance (see Table I).

Mediated Moderation Analyses

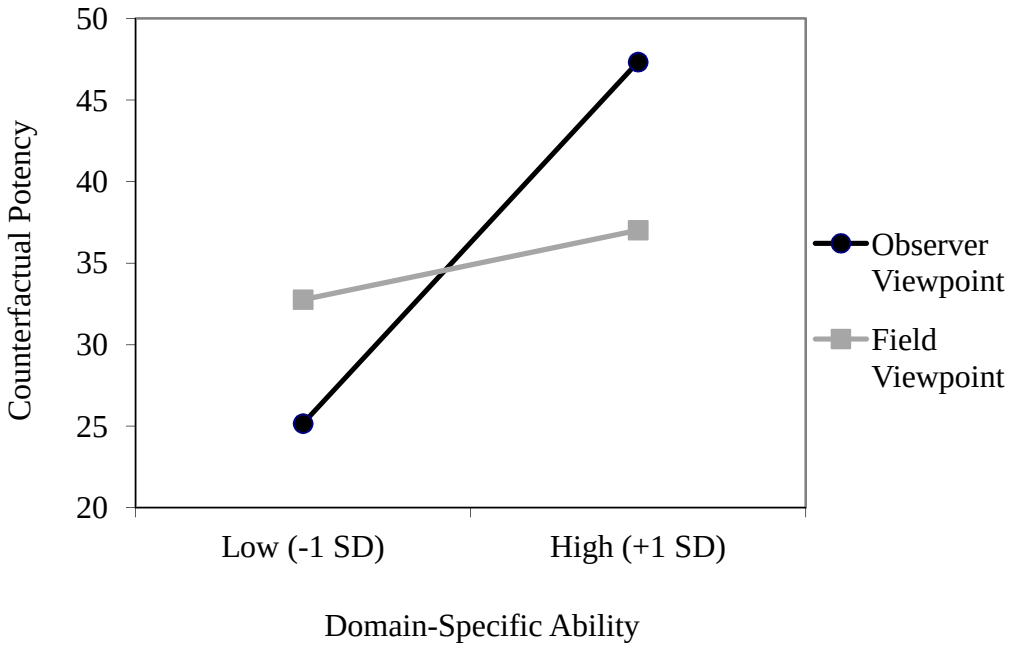
Because people who are knowledgeable about a particular domain of relevance tend to produce stronger counterfactuals (see Mandel & Lehman, 1996; Sobel, 2011), it was hypothesized that an indirect link exists between a Counterfactual Viewpoint condition × Domain-Specific Ability interaction and Performance Expectancy via Counterfactual Potency (see Thomas & Petrocelli, 2014). A mediated moderation analysis was used to explore this possibility. Mediated moderation, as described by Muller, Judd, and Yzerbyt (2005; see also Wegener & Fabrigar, 2000), occurs when distal variables interact to influence a mediator variable, with that mediator directly carrying the effects of the interacting variable to the dependent measure. Thus, the possibility that participants' Counterfactual Viewpoint condition interacts with their Domain-Specific Ability to influence Counterfactual Potency, and subsequently expected future performance, was explored.

As a first test of this possibility, a Counterfactual Viewpoint condition × Domain-Specific Ability interaction on Counterfactual Potency was tested using a hierarchical multiple regression analysis recommended by Cohen and Cohen (1983). Participants' Domain-Specific Ability and Counterfactual Viewpoint Condition were centered and entered in the first step, and their interaction term was entered in the second step of the regression analysis. Participants' Initial Score on the Ping Pong game was also controlled for in each step of the regression analysis. A significant main effect of Domain-Specific ability was revealed, such that the higher a participant's Domain-Specific Ability, the higher his or her Counterfactual Potency, $\beta = 3.98$, $t(127) = .32$, $p < .001$. Consistent with the ANCOVA results described above, no significant main effect was observed, however,

for Counterfactual Viewpoint condition on Counterfactual Potency, β = .03, *t*(127) = .37, *ns*. As hypothesized, the Counterfactual Viewpoint condition × Domain-Specific Ability interaction term significantly predicted Counterfactual Potency, β = .21, *t*(126) = 2.50, *p* = .01.

Figure 1

Simple slopes for high versus low Domain-Specific Ability and Counterfactual Viewpoint condition predicting Counterfactual Potency



To interpret the Counterfactual Viewpoint condition × Domain-Specific Ability interaction, simple slope analyses were conducted according to the procedures recommended by Aiken and West (1991). Thus, simple slopes were plotted and examined at one standard deviation above and below the means of Domain-Specific Ability and Counterfactual Viewpoint condition (see Figure 1). As expected, these analyses revealed that when Domain-Specific Ability was low, there was not a significant difference between the field and observer Counterfactual Viewpoint conditions on

Counterfactual Potency, β = -.18, $t(124) = -1.50$, *ns*. Interestingly, the pattern was very different for participants who reported relatively high Domain-Specific Ability; when Domain-Specific Ability was high, the observer Counterfactual Viewpoint led to significantly greater Counterfactual Potency compared to the field Counterfactual Viewpoint, β = .24, $t(124) = 2.03$, $p < .05$.

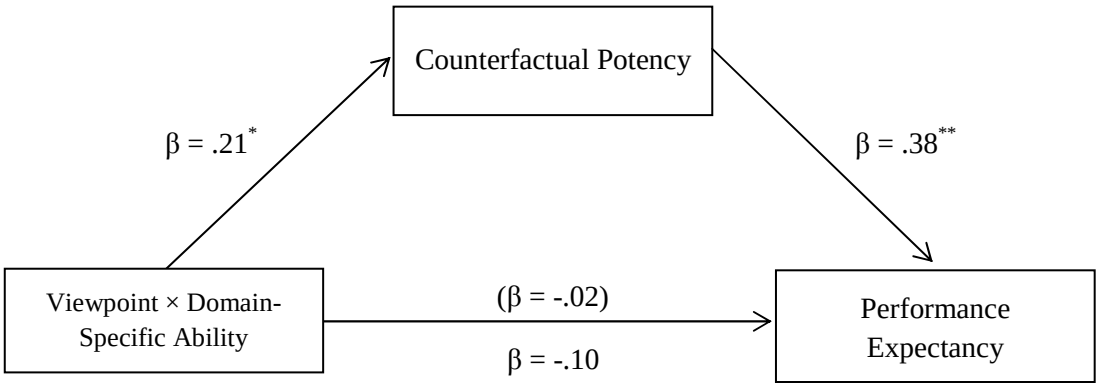
Next, the obtained Counterfactual Viewpoint condition × Domain-Specific Ability interaction was used as the initial predictor in a mediation analysis. This analysis also included the effects of all the distal predictors on the criterion, Performance Expectancy (see Figure 2). Counterfactual Potency was still found to be significantly associated with Performance Expectancy when controlling for the Counterfactual Viewpoint condition × Domain-Specific Ability interaction, as well as participants' Initial Score.[3] In order to test the mediation, a bootstrap procedure, as recommended by Preacher and Hayes (2004, 2008), was completed. This method tests the significance of the indirect effect of the Counterfactual Viewpoint condition × Domain-Specific Ability interaction on Performance Expectancy. Furthermore, this method permitted the statistical control of participants' Initial Score, and constructs bias-corrected confidence intervals based on 5,000 random samples with replacement from the full sample. Specifically, this method tests whether or not the size of an indirect effect differs significantly from zero. The size of the indirect effect was .14 (*SE* = .07), and the 95% confidence interval excluded zero, 95% CI [.020, .311]. Thus, Counterfactual Potency

[3] Note, however, that the direct path from the Counterfactual Viewpoint condition × Domain-Specific Ability on Performance Expectancy was not found to be significant. This pathway was also not found to be significant when controlling for the mediator, Counterfactual Potency (see Figure 2). Nonetheless, statisticians and researchers have strongly advocated for mediation tests that focus on the indirect effect, and have convincingly eliminated the necessity of a significant direct path in order to demonstrate statistical mediation (e.g., Rucker, Preacher, Tormala, & Petty, 2011).

significantly mediated the relationship between the Counterfactual Viewpoint condition × Domain-Specific Ability interaction and future Performance Expectancy. This finding suggests that when participants' Domain-Specific Ability is high and they simulate their counterfactual thought from the observer Counterfactual Viewpoint, their Counterfactual Potency tends to be greater, and as a result, they report a greater expectation for future performance.

Figure 2

Mediated Moderation relationship between Counterfactual Viewpoint condition × Domain-Specific Ability and future Performance Expectancy by Counterfactual Potency.



Note. Field = 0; Observer = 1 $^{*}p < .05$; $^{**}p < .001$

The same mediated-moderation procedure described above was performed using Final Score and Persistence as the criterion variable as opposed to Performance Expectancy. Considering Counterfactual Potency was not significantly correlated with either Final Score or Persistence (see Table I), it is reasonable to assume that no significant mediation by Counterfactual Potency exists for the relationship between the Counterfactual Viewpoint condition × Domain-Specific Ability interaction and either Final Score or Persistence. By similar reasoning, the Counterfactual Viewpoint condition

× Domain-Specific Ability interaction was not found to significantly predict Performance Expectancy (see Figure 2), thus, the hypothesized mediation of the interaction and Final performance (as well as Persistence) by Performance Expectancy was not confirmed. Therefore, the observer-performance hypothesis was not supported by the data.

In summary, Counterfactual Viewpoint condition only predicted Counterfactual Potency under the circumstance that Domain-specific Ability was high. Specifically, as predicted, those who had high Domain-Specific Ability and were assigned to the observer Counterfactual Viewpoint condition had greater Counterfactual Potency in comparison to those with high Domain-Specific Ability in the field condition. No difference was found, however, between the two Counterfactual Viewpoint conditions for Counterfactual Potency when Domain-Specific Ability was low. Additionally, as hypothesized, Counterfactual Potency significantly mediated the relationship between the Counterfactual Viewpoint condition × Domain-Specific Ability interaction and Performance Expectancy. Thus, these data suggest that those with high Domain-Specific Ability who were assigned to the observer condition had more optimistic expectations for their future performance indirectly via higher Counterfactual Potency. Notably, there was no significant mediation of the Counterfactual Viewpoint condition × Domain-Specific Ability interaction and Final Score or Persistence by Counterfactual Potency or by Performance Expectancy. Therefore, the observer-performance hypothesis was not supported by the data. Consistent with the field-performance hypothesis, on the contrary, a direct effect of Counterfactual Viewpoint condition on Final Score was found, such that those in the field Counterfactual Viewpoint condition had higher scores during the final trials of the game. Similarly, the field Counterfactual Viewpoint condition displayed an

even stronger practice effect from the initial trials to final trials of the game in comparison to the observer Counterfactual Viewpoint condition. No difference was found between the two Counterfactual Viewpoint conditions for Persistence, although higher persistence was associated with higher Final Score.

DISCUSSION

Despite abundant research on perceptual viewpoints involved in memory and imagination, the literature has yet to acknowledge the possibility of perceptual viewpoints involved in the simulation of counterfactual thoughts. Given that counterfactual thoughts following undesirable outcomes are ubiquitous, the impact of counterfactual viewpoints on psychological and behavioral responses of counterfactual thoughts is an important topic. This study was the first to investigate whether the proposed construct of counterfactual viewpoints could be reliably manipulated.

Previous research suggests that the field and observer visual perspectives exert differential effects on affective, cognitive, and behavioral responses (e.g., Callow et al., 2013; Libby et al., 2007; Vasquez & Buehler, 2007; White & Hardy, 1995). Recent research also suggests that counterfactual potency influences the strength of the link between counterfactual thinking and subsequent reactions (Petrocelli et al., 2011). Moreover, expectancies for the future are said to be characterized by the perceived likelihood of their occurrence (Koehler, 1991; Roese & Sherman, 2007), therein suggesting counterfactual potency likely plays an influential role on expectancies derived from counterfactual thoughts. Thus, it was reasonable to predict counterfactual potency to mediate the effect that counterfactual viewpoint has on performance expectancies. Recent research, however, suggests this assumption may only hold in conditions for which participants perceive they are knowledgeable or competent. An initial correlational study conducted by Thomas and Petrocelli (2014) found that when knowledge for Blackjack was high, participants who utilized the observer perspective during their counterfactual thought simulation reported greater counterfactual potency, and as an effect, more

optimistic performance expectancy. On the basis of this finding, it was hypothesized that when domain-specific ability for a novel Ping-Pong task was high, individuals assigned to the observer counterfactual viewpoint condition would perceive the likelihood of their counterfactuals to be great; in turn, this higher counterfactual potency was predicted to lead to a greater expectancy for future performance. This hypothesis was fully supported by the data.

Additionally, two contrasting hypotheses were presented for the means by which counterfactual viewpoint impacts performance: the *observer-performance hypothesis* and the *field-performance hypotheses.* Existing research suggests that expectancies are predictive of performance, such that high expectations for performance typically lead to success and low expectations typically lead to failure (see Roese & Sherman, 2007). Furthermore, there is evidence that individuals exert more effort and persist longer at tasks for which they expect to perform well (Carver et al., 1979). Those who have more optimistic performance expectancies should, therefore, perform better and persist more in a future performance .Thus, the observer-performance hypothesis held that those who were assigned to the observer perspective would perform better and persist longer during the final trials of the game, as a direct result of their more optimistic expectancies and greater counterfactual potency.

However, mental simulation has only been found to be beneficial for performance to the extent that the images produced are accurate representations of the task. Mental simulation leading to overly optimistic or biased expectancies can actually hinder one's ability to successfully perform a task (e.g., Oettingen & Mayer, 2002**;** Pham & Taylor, 1999). There are reasons to suspect that the field viewpoint's experiential focus on

concrete details and component processes would produce more accurate mental simulation than the observer viewpoint (e.g., Callow et al., 2013; Pham & Taylor, 1999; White & Hardy, 1995). Thus, the field-performance hypothesis held that the field counterfactual viewpoint would directly benefit performance. The data were more consistent with the field-performance hypothesis. Participants assigned the field counterfactual viewpoint performed significantly better in the final trials of the Ping Pong game and showed greater improvement between trials in comparison to those assigned to the observer counterfactual viewpoint condition. Notably, these effects were found despite the observer counterfactual viewpoint leading to both greater ratings of counterfactual potency and more optimistic expectancies for future performance. No difference was found, however, between the two counterfactual viewpoint conditions and persistence at the task in the final game. Explanations for these results will be discussed in turn.

Explanations for Findings

To start, the finding that the interactive link between perceived ability and counterfactual viewpoint on performance expectancy was mediated by counterfactual potency is worth expanding upon. Previous research suggests that being knowledgeable about a particular domain of relevance results in more potent counterfactual thoughts (e.g., Mandel & Lehman, 1996; Sobel, 2011). Those who felt incompetent or unskilled may have been unable to visualize performing better from their assigned counterfactual viewpoint because they did not see improvement as probable. Hence, these individuals likely simulated weak counterfactuals that were uninfluenced by counterfactual viewpoint and counterfactual potency. This interpretation for the moderation effect of

domain-specific ability is compatible with the null result found for the effect of counterfactual viewpoint on counterfactual potency when domain-specific ability was low. Thus, this consistent finding from two studies (see also Thomas & Petrocelli, 2014) is indicative that counterfactual viewpoint is influential for counterfactual potency and performance expectancy only under the condition that there is perceived competence in the domain.

Once the condition of high domain-specific ability is met, the observer perspective was found to be associated with greater counterfactual potency, and in turn, more optimistic expectancies for performance. On the basis of existing research, two compatible explanations provide support for this finding. To begin, the actor-observer bias for visual viewpoints depicts the observer visual perspective as characteristic of dispositional attributions and the field visual perspective as characteristic of situational attributions (e.g., Frank & Gilovich, 1989). Therefore, participants who utilized the observer perspective when simulating their counterfactual thoughts may have attributed their performance more to personal faults (e.g., being too risky or conservative in their tosses), than to situational aspects (e.g., distance from the cups). By granting less weight to the contextual features of the game, participants may be fostering an illusion of control implying their performance can be improved by changing their own actions alone. Perceived control has been found to be influential for the content of counterfactual thoughts (e.g., Girotto et al.,1991; Markman et al., 1995; Roese, 1997) and may directly impact the perceived likelihood of these thoughts. That is, people using the observer viewpoint may grant less weight to the contextual features important to the game, and

thereby perceive their counterfactual alternatives as more likely leading to optimistic expectations for future performance.

Another explanation for the findings of this study can be derived from more recent research in imagery viewpoints, specifically, Libby and Eibach's (2011) meaning-making model. Recall that the meaning-making model conveys the observer perspective as encompassing a conceptual mindset that focuses on abstract construals, such as specific goals. The field perspective, on the other hand, is believed to elicit a more experiential mindset that focuses on the concrete features and component processes of the events. Focusing on a certain goal for how a specific outcome can be improved upon has been found to heighten perceptions of importance and lead to greater motivation for future performance in comparison to focusing on the specific features of the event itself (Libby et al., 2007; Vasquez & Buehler, 2007; White & Hardy, 1995). Similarly, visualizing oneself completing a specific goal has been found to elevate confidence and self-efficacy expectations (e.g., Fournier et al., 2007; Pham & Taylor, 1999).Thus, simulating alternatives from an observer viewpoint may lead one to focus precisely on the overall significance and attainment of the desired outcome, which in turn, may make the goal seem more proximal and thus more likely to occur. This greater counterfactual potency subsequently impacts optimism for future performance expectancies. Notably, this explanation is not mutually exclusive of the first; both attributing one's performance to dispositional features and imagining the alternative as more in line with one's specific goals may have jointly influenced the demonstrated findings.

What may seem contradictory, however, was the finding that the observer viewpoint's optimistic performance expectancies did not actually induce better

performance. Rather, it was the field counterfactual viewpoint that enhanced performance. Mental simulation leads to the alteration of stored mental representations for action sequences, thereby making them more accessible when needed for performance (Epstude & Roese, 2008; Kosslyn & Moulton, 2009). Thus, only to the extent that mental simulations are accurate will they effectively guide the corrective behavior needed to enhance performance. Overly optimistic or inaccurate expectancies, on the contrary, can have a detrimental effect on performance (e.g., McNulty & Karney, 2004; Oettingen & Mayer, 2002; Pham & Taylor, 1999; Ramsey et al., 2009). There are several reasons to suspect that mentally simulating events from the observer viewpoint can lead to overly optimistic and inaccurate performance expectancies. For one, attribution theory research demonstrates that observers often fail to correct for situational features when explaining the behavior of others (see Jones, 1990; Ross, 1997). In parallel, individuals may also discount task features that are essential to performance when mentally simulating their experiences from an observer perspective. On the contrary, actors' greater awareness for situational features allows them to make corrections when explaining and predicting behavior. Thus, maintaining the original perspective of the event may lead to more accurate mental simulation, and in effect, greater accuracy during performance (e.g., Callow et al., 2013; White & Hardy, 1995).

Other theoretical explanations for the findings can be derived from research for mental practice. The existing literature suggests that how one mentally practices a task can influence performance, but only to the extent that mental practice closely approximates physical practice. Whereas process simulation refers to visually rehearsing the actual steps that are needed to successfully perform a task, outcome simulation refers

to envisioning the desired outcome. Pham and Taylor (1999) demonstrated that outcome simulation was associated with higher efficacy expectations, likely due to the visualization of oneself achieving a desired outcome increasing ones perceptions of the likelihood for it actually occurring. Research suggests that higher efficacy expectations prime greater motivation to perform well, which may explain why there was no difference found for the two counterfactual viewpoint conditions for persistence (e.g., Carver et al., 1979). Yet similar to the findings of this study, Pham and Taylor (1999) found that these higher expectations derived from outcome simulation did not equate to better performance. Process simulation, on the other hand, did lead to better performance. Focusing on the steps required to succeed at a task allows a person to develop concrete plans for how to be successful at it, and thus is more akin to physical practice. By focusing mostly on the aspired outcome, outcome simulation disregards the necessary steps needed to plan accordingly. Because the field viewpoint leads to a greater focus on concrete details including physical, emotional, and psychological states, it may be more adept for process simulation. The observer perspective, in contrast, places an event in the broader context of one's identity, traits, goals, and beliefs, and therefore may elicit more outcome focused simulation (Libby & Eibach, 2011; Pham & Taylor, 1999). Hence, the field counterfactual viewpoint may have led participants to envision the actual steps needed for the simulated alternatives to lead to better performance, which had a direct effect on actual performance.

Finally, more recent research in mental practice has demonstrated that the effect visual perspective has on performance may be dependent on its function and the type of task (e.g., Callow et al., 2013; Fournier et al., 2007). When visualizing tasks from the

observer perspective, one's self may serve as a model to imitate in the future. Thus, the observer perspective may be more beneficial for tasks that involve aspects of shape and form (e.g., gymnastics; Hardy & Callow, 1999; White & Hardy, 1995). On the contrary, the field perspective has been found to benefit performance for tasks that involve spatial and temporal components, likely due to its experiential focus (e.g., skiing; Bernier & Fournier, 2010; Callow et al., 2013). Moreover, the field perspective has been found to be more successful when its function is to modify a task sequence in comparison to the observer perspective (Fournier et al., 2007). The Ping Pong game played in this study arguably involved a great deal of hand-eye-coordination skills, in that participants had to accurately determine the best route by which the get the ball into the cups. Consequently, the field visual perspective may have been more functionally equivalent to the game, leading to more effective simulation and better subsequent performance. Additionally, the very nature of counterfactual thinking involves the undoing of past events; thus, modifying ones past performance in light of better alternatives may have been easier from the field counterfactual perspective. The type of task, therefore, cannot be ruled out as an explanation for the finding that the field counterfactual viewpoint is more effective for performance in comparison to the observer counterfactual viewpoint.

Limitations and Future Directions

The current study presented encouraging findings that provide direction for future research in counterfactual viewpoints. Nevertheless, this study contained noteworthy limitations that can be addressed in the future. For one, there is some evidence that the counterfactual viewpoint manipulation may have been more potent for the field counterfactual viewpoint condition compared to the observer counterfactual viewpoint

condition. The manipulation check suggested that the manipulation had its intended effect, such that participants in the field condition described their counterfactual simulation as more field than those in the observer condition and those in the observer condition described their counterfactual simulation as more observer than those in the field condition. However, the alternative interpretation of the interaction of counterfactual viewpoint by manipulation check question suggests that whereas the field condition rated their thoughts as more field than observer, the reverse was not true for the observer condition; participants in the observer counterfactual viewpoint condition did not rate their thoughts as more observer than field. Notably, however, the study revealed the hypothesized effects despite this limitation.

There are several potential explanations for why the manipulation was stronger for the field condition than the observer condition. For instance, the field perspective has traditionally been found to emerge more frequently than the observer perspective in autobiographical memory recall, especially for more recent memories (Nigro & Neisser, 1983; Robinson & Swanson, 1993; Terry & Horton, 2008). The fact that participants were asked to simulate their counterfactual thought immediately after playing the Ping Pong game may have made it more difficult for participants to create alternatives to their past performance from the observer perspective. Future studies in counterfactual viewpoint should split the study into two research phases to delay the time between the performance and the simulation of the counterfactual thought, although such a strategy is not always feasible. Moreover, there is evidence in the literature that the field visual viewpoint may be the default mode of imagination and recall, likely because it is a closer representation of the original experience (Bernier & Fournier, 2010; Nigro & Neisser,

1983). Therefore, greater effort and motivation is likely involved in opting to recall a memory from the observer perspective.

Finally, previous research suggests that when tasks involve multiple elements, individuals tend to switch between the two visual perspectives depending on their purpose for recall and which viewpoint is more equivocal to the experience at the time. For example Fournier et al. (2007) found that skydivers tended to adopt the observer viewpoint when practicing their form before take-off and the field viewpoint when modifying the sequence of a dive. It is unclear from the manipulation check questions whether participants naturally switched between the two modes of recall when simulating their counterfactual thoughts and this may have been the reason why those in the observer condition did not report different levels of field and observer simulation. Future research should control for this potentially unavoidable switching of visual perspective.

In addition to the manipulation of Counterfactual Viewpoint, there were a few other notable methodological limitations. For instance, because participants played both phases of the Ping Pong game in sets of three, there is the potential that social comparison could have affected the performance and persistence measures used in this study. Future research should seek to replicate the findings while utilizing independent observations of performance and persistence. Additionally, the short 30-minute duration of the study does not allow for insight into the long-term effects of the two counterfactual viewpoints. Therefore, it remains unclear whether the field counterfactual viewpoint simply has an immediate advantage on performance in comparison to the observer perspective or whether the field perspective has long-term benefits for performance. Finally, the lack of a control condition in this study makes it impossible to say whether

the field counterfactual viewpoint in general is functional for performance or simply in comparison to the observer counterfactual viewpoint condition. Likewise, the lack of a control condition makes it impossible to determine whether or not the observer counterfactual viewpoint condition actually hinders performance relative to average. Future research should include the addition of a control condition in order to examine such possibilities.

Finally, there are several potential variables that were not controlled for in the study that may have had an influence on the effects found. For example, there is evidence that individuals may differ in their preference of imagery viewpoint and that this individual difference influences the ease and vividness of the simulation (Callow & Roberts, 2010). Therefore, counterfactual viewpoints may only be influential for ensuing counterfactual thoughts in that they match a person's imagery preference. Past research also suggests that the ease of simulation impacts perceptions of likelihood that the imagined event will occur (e.g., simulation heuristic, Kahneman & Tversky, 1982).Thus, in addition to domain-specific ability, imagery preference may moderate the strength of the counterfactual thought and subsequent counterfactual potency.

Another potential variable that may have played an unidentified role in the findings is affect. Negative affect, often evoked via negative outcomes or failure, is arguably the most influential determinant of counterfactual activation (Davis et al., 1995; Roese, 1997; Roese & Olson, 1997; Sanna & Turley, 1996). Although initial score was controlled for in all of the analyses, the affect that may have been elicited from this score was not. A participant's initial score may have impacted his or her affect differentially on the basis of individual differences and expectations. For example, a participant who

scored a “7” on the initial trials of the game may have been fairly content with his or her score since he or she made a few cups; another participant with the same score, however, may have been disappointed. This difference in affect, therefore, could have influenced the strength of participants’ counterfactual thoughts. Moreover, visual viewpoints have also been found to influence affect, such that the field visual viewpoint typically leads to more emotionally intensive simulation than the observer visual viewpoint (e.g., Berntsen & Rubin, 2006; McIssac & Eich, 2002; Robinson & Swanson, 1993). Thus, any negative affect following the initial game may have been heightened for those in the field condition in comparison to those in the observer condition, thereby also impacting the potency of their simulation. Future research should determine the role affect may have in the effect of counterfactual viewpoints on counterfactual thoughts.

Implications and Conclusions

This study was one of the first to acknowledge the existence of counterfactual viewpoints in general, as well as their potential impact on counterfactual potency and subsequent expectancies and performance. Consistent with the findings of Thomas and Petrocelli (2014), those who had high domain-specific ability and were assigned to the observer counterfactual viewpoint condition reported higher counterfactual potency and, as a result, more optimistic expectancies for future performance. Interestingly, it was those assigned to the field counterfactual condition who actually demonstrated better performance.

Given that counterfactual thoughts are simulated naturally after everyday occurrences, this study has important implications for goal-pursuit, decision-making and performance preparation. The results suggest that the observer counterfactual viewpoint

leads to more optimistic performance expectancies via counterfactual potency. Thus, the observer viewpoint may be beneficial for the initiation of goals. For example, someone who wishes to lose weight may simulate the following counterfactual: "If only I had not eaten out so much last week, then I may actually lose weight." If this person utilizes the observer viewpoint to simulate this counterfactual thought, he or she may have more optimistic expectations for future weight loss through dispositional attributions and construing the event in terms of one's goals and self-concept (e.g., Frank & Gilovich, 1989; Libby & Eibach, 2011; Pham & Taylor, 1999). Just seeing oneself preparing meals at home and, in effect, losing weight may elicit optimistic expectations and heighten the motivation to actually pursue this goal. Yet, as the current investigation suggests, these overly optimistic expectations may not actually result in goal completion. If this is the case, then the observer viewpoint would not be advisable and the disconfirmed expectancies may risk psychological consequences such as negative affect (e.g., Roese & Sherman, 2007). The field counterfactual viewpoint, on the contrary, was found to have a direct influence on performance and therefore may be more beneficial for behavioral regulation.

These findings can also be applied to Sport Psychology and mental simulation in the form of mental practice. Mental practice is said to be effective so long as it closely resembles physical practice (Driskell et al., 1994; Kosslyn & Moulton, 2009; Pham & Taylor, 1999). Presumably, because the field viewpoint aligns with the original perspective from which the event occurred, simulation from this angle tends to result in more accurate and vivid representations of experience (e.g., Callow et al., 2013, Nigro & Neisser, 1983; White & Hardy, 1995). Therefore, the field viewpoint may be more

beneficial to mental practice in the form of counterfactual thinking. For example, a swimmer may counterfactualize, “If only I had made a quicker start off the block, then I would have placed in the race.” If the swimmer uses the field counterfactual viewpoint when simulating this counterfactual alternative, he or she may be better able to visualize “undoing” the slow start and modify the process to have a more powerful take-off that results in a better swim time. The observer perspective, however, may lead to more of an outcome type focus in which the swimmer visualizes him or herself reaching the goal of placing in the race (e.g., Pham & Taylor, 1999). However, because the observer perspective does not encourage the planning of actual steps needed to improve, it may not be as effective as the field counterfactual viewpoint for mental practice and future performance. Therefore, the field counterfactual viewpoint may be more advisable for athletes reflecting on their performance.

To conclude, the construct of counterfactual viewpoint has implications for behavioral regulation, whether in the form of goal-pursuit or physical performance. This study provides insight into potential questions about mental simulation in the form of counterfactual thoughts and their influence on psychological and behavioral responses and raises issues to be addressed in future research.

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APPENDIX A

Task Scoring Sheet

INSTRUCTIONS: Shortly, you will be playing a Ping Pong game. The object of this game is to score as many points as possible by tossing the ping pong balls into the cups. You may use any method you choose to get the balls into the cups, but you must remain behind the table and only use the cups within the lane in front of you.

The closest cup is worth 1 point, the next 2 points, and the farthest 3 points. You will be given SIX ping pong balls (six shots) for each trial. Thus, the total possible score for a single trial is 18 points.

You are allowed two practice trials. After which, you will be playing two scored trials. We ask that you write your score for each of the scored trials in the blanks below. You do not need to write down your score for the practice trials.

TRIAL 1: _____

TRIAL 2: _____

APPENDIX B

Counterfactual Potency

People often have thoughts like "if only" when thinking about the past. Often, these thoughts are about things that are better than what actually happen.

For example, imagine a doctor who has to decide upon one of two treatments for a patient with a serious disease. The doctor decides on Treatment A and, unfortunately, the patient dies.

The doctor might say "IF only I had chosen Treatment B, THEN the patient might have lived."

This is an example of an if-then statement. People often make if-then statements when they consider alternatives that are better than they actually experience.

We might ask the doctor questions about this "if…then" statement:

1) Consider the "IF" part of that statement: How likely do you think it was for the IF part of your thought to actually occur? In other words, at the time you made your decision, how likely were you to choose Treatment B instead of Treatment A (that is, how close did you come to choosing Treatment B instead of Treatment A)?

2) Consider the "THEN" part of that statement: Assuming the IF part of your thought actually occurred, how likely do you think it was for the THEN part of your thought to actually occur? In other words, assuming you had actually chosen Treatment B instead of Treatment A, then how likely do you think it was that the patient would have lived?

Because we would like to ask you questions about the "if…then" statement you wrote earlier, make sure you understand the difference between these two kinds of questions before moving on to the next screen frame.

Consider just the first part of your thought, the IF part. What do you perceive was the likelihood of the IF part actually occurring?

0	1	2	3	4	5	6	7	8	9	10
NOT AT ALL likely										EXTREMELY likely

Now consider the second part of your thought, the THEN part. Assuming the IF part of your thought actually occurred, what do you perceive was the likelihood of the THEN part actually occurring?

0	1	2	3	4	5	6	7	8	9	10
NOT AT ALL likely										EXTREMELY likely

CURRICULUM VITAE

Stephanie B. Thomas
Department of Psychology, 458
Wake Forest University
Winston-Salem, NC 27109
Thomsb12@wfu.edu

EDUCATION

Wake Forest University, May, 2014 (Expected)
Master of Arts in Psychology
GPA: 4.0
Thesis: *Counterfactual Viewpoints: How Our Viewpoint of Undoing the Past Shapes Our Future Expectations and Performance*

University of North Carolina at Chapel Hill, May, 2012
Bachelor of Arts in Psychology with Highest Honors and Highest Distinction
GPA: 3.84 Major GPA: 3.89
Thesis: *The Effect of Narrative Transportation on Persuasion by Conflicting Narratives*

HONORS AND AWARDS

Graduate Teaching Assistantship, Wake Forest University (2012-2014)
Phi Beta Kappa National Honors Society
Psi Chi- The National Psychology Honors Society
UNC- Chapel Hill Chapter Dean's List (Fall 2008- Spring 2012)
Gamma Sigma Alpha- the National Greek Honor's Society

PROFESSIONAL PRESENTATIONS

Thomas, S.B., Green, M.C., & Simons, J.J.P. (2012-2013). *The effect of narrative transportation on persuasion by conflicting narratives.* Poster presented at: Meeting of the Society for Personality and Social Psychology, New Orleans, LA. (Feb, 2013); Meeting for Society of Southeastern Social Psychology, Gainesville, FL. (Oct, 2012);

Thomas, S.B., & Petrocelli, J.V. (2014, February). *How performance expectancies are shaped by first and third person counterfactual viewpoints*. Poster session presented at the 15th annual Society for Personality and Social Psychology conference, Austin, TX.

RESEARCH EXPERIENCE

Graduate Research Assistant, Dr. John V. Petrocelli, Wake Forest University, Fall 2012-Present

- Current duties include proposing and coordinating research projects, creating study materials, submitting IRB proposals, running experiment sessions, analyzing data, training undergraduate RA's, and writing Graduate Thesis.

Research Assistant, Dr. Melanie Green, UNC-Chapel Hill, Fall 2010- Spring 2012

- Responsibilities consisted of attending weekly lab meetings, running experiment sessions, designing and providing methodological feedback, analyzing and coding data via SPSS, discussing results, and proposing ideas for future research.

TEACHING EXPERIENCE

Lab Instructor, Research Methods in Psychology, Wake Forest University, Fall 2012-Present

- Prepares and teaches a two-hour weekly lab meeting
- Instructs students in how to examine univariate statistic using SPSS
- Grades homework, exams, and scientific research reports
- Facilitates a lab research project

Psychology 101 Recitation leader, UNC-Chapel Hill, Fall 2011

- Taught two fifty-minute recitations once a week
- Recorded attendance and participation
- Created a lesson plan for each week
- Provided peer mentoring to students for class and major

COMPUTER AND LABORATORY SKILLS

- Understanding of univarite and multivariate statistics
- Proficient with statistical software (i.e., SPSS, SAS, EXCEL)
- Proficient with study design programs (i.e., MediaLab, Qualtrics, Inquisit)
- Efficient at literature review (i.e., PsycInfo, Pubmed, etc.)

COURSEWORK

Graduate: Social Psychology, Cognitive Psychology, Developmental Psychology, Personality Psychology, Biological Psychology, Seminar in Implicit Cognition, Seminar in Game Theory, Research Design and Analysis I and II

Undergraduate: Introduction to Psychology, Research Methods I and II, Social Psychology, Cognitive Psychology, Abnormal Psychology, Developmental Psychology, Biological Psychology, Personality Psychology, Cognitive Neuroscience, Psychology and Law, Honors in Psychology I and II