A CHANGE IN STRATEGY:
INVESTIGATING DYNAMICS IN REGULATORY FOCUS THEORY

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ABSTRACT

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This study explored within-person fluctuations in regulatory focus and strategy to shed light on the origin and causal direction of constructs in regulatory focus theory. I conceptualized and tested a dynamic model, which suggested that people adapt their strategies and state regulatory focus in the pursuit of regulatory fit and maximum performance. To test my expectations, I used a 3 (eagerness task incentive, vigilance task incentive, and neutral) X 2 (metacognition vs. no metacognition) repeated measures experimental design. Results suggest that, in response to environmental disruptions, people flexibly adapt their strategies but not their state regulatory focus. I highlight implications for research utilizing regulatory focus theory and provide practical recommendations.

Keywords: Regulatory focus, self-regulation, goals, strategies.

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INTRODUCTION

Employee regulation of behavior is critical to performance, as workers are increasingly required to seamlessly adapt to new tasks and changing jobs (Kozlowski, Gully, Nason & Smith, 1999). To adapt, individuals must be able to adjust their thoughts, emotions, and behavior to achieve goals over time (Baard, Rench, & Kozlowski, 2013)—a process known as self-regulation (Porath & Bateman, 2006). In particular, adapting strategies (Zimmerman, 1998) and goals (Senko & Harackiewicz, 2005) are critically important to managing performance across situations.

One self-regulatory theory—regulatory focus—captures the effects of content goals and strategies. This framework states that all humans hold fundamental yet different survival systems. Humans with well-developed promotion systems are concerned with advancement, development, and nurturance. They tend to use an eagerness strategy—known as a focus on achieving 'hits' and speed rather than accuracy. Those with well-developed prevention systems are concerned with safety, needs, and obligations (Higgins, 1997). They tend to use a vigilance strategy—known as being cautious, focusing on accuracy, and avoiding false alarms. When regulatory focus systems coincide with strategies in this way, people experiences regulatory fit and thus exhibit greater effort and performance than when they experience regulatory misfit (Higgins, 2000). Regulatory focus theory has proven useful to understanding performance in the work domain (Lanaj, Chang, & Johnson, 2012).

Although regulatory focus captures higher-level content goals (i.e., regulatory focus) and strategies, the framework fails to specify the dynamics of how humans adapt these goals and strategies over time. For example, the origins of within subject changes in strategy and state regulatory focus are largely unknown (Lanaj et al., 2012) and are not fully specified by theory.

Regulatory fit is generally conceived as a phenomenon that occurs between individuals (Higgins, 2000). Those with strong promotion systems choose eagerness strategies; others with well-developed prevention systems choose vigilance strategies. As such, the direction of the relationship is one-way—from regulatory focus to strategy. In contrast, I argue that regulatory fit is best viewed as a dynamic process whereby changes in strategies can prompt changes in state regulatory focus.

A dynamic view of regulatory fit may account for more variance in performance. Specifically, switches between promotion and prevention and between eagerness and vigilance may be necessary to maximize performance across situations. Contrary to the belief that regulatory fit is almost always most effective (Higgins, 2000), individuals may switch between regulatory fit and regulatory misfit to maximize performance across situations. In doing so, they may experience a tradeoff between 'what feels right' (i.e., regulatory fit) and 'what is most effective'.

The goal of this research is to test a dynamic theory of regulatory focus (a) to understand the origin of state regulatory focus and strategy adaptation, (b) to rethink regulatory fit as a process that unfolds over time, (c) and to account for more variance in performance. I will first discuss the general process of self-regulation and then discuss why theories of self-regulation should be able to capture dynamic processes. Next, I will review regulatory focus theory and the malleability of strategies, state regulatory focus, and regulatory fit. This section leads to contributions, and afterwards, hypotheses. Finally, methodology will be discussed.

REVIEW OF SELF-REGULATION

The purpose of this review is to provide support for revising regulatory focus theory to more fully understand strategy and regulatory focus adaptation. As argued in the first section on self-regulatory dynamics, theories that capture processes such as goal and strategy adaptation are best positioned to understand the mechanisms responsible for work outcomes. Turning to a specific theory of self-regulation, I show that humans adapt regulatory focus goals, strategies, and regulatory fit to remain effective across situations. Finally, I present contributions that result from testing a theory of regulatory focus that captures switching between promotion and prevention and between eagerness and vigilance.

Self-Regulatory Dynamics

Self-regulation is the systematic adaptation of thoughts, feelings and behavior to direct goal-related activities over time and across situations (Porath & Bateman, 2006). The process of adaptation—a change in cognition, affect, motivation or behavior, resulting from changing environments—accounts for the effects of self-regulation on performance (Baard, Rench, & Kozlowski, 2013). Theory by Bell and Kozlowski (2010) and findings from Bell and Kozlowski (2008) are consistent with the notion that motivational, cognitive, and affective self-regulation processes underlie adaptive performance—known as performance in novel or more complex situations.

In turn, adaptive performance leads to job performance. As organizational pressure from internal and external change (Bell & Kozlowski, 2008) forces novel, unstable and unpredictable work environments (Kozlowski, Gully, Nason & Smith, 1999), employees must adapt to remain effective. To understand the mechanisms responsible for performance in adaptive environments, one must understand self-regulatory dynamics. In other words, the dynamic aspect of self-

regulation is what allows self-regulatory frameworks to be useful for understanding adaptive responses to changing conditions, and in turn, job performance.

Goal selection and revision. One self-regulatory process in particular—goal selection and revision—is critical to understanding performance. Goals are internal representations of desired states that direct behavior. Agents adapt goals to self-regulate behavior (Senko & Harackiewicz, 2005). For example, environment triggers such as negative performance can prompt downward goal revision to more realistic desired states—a process known as discrepancy reduction (Bandura, 1989). Presumably, the absence of discrepancy reduction would render humans inert, showing the importance of this process (Bandura, 1989). Conversely, environmental triggers such as positive feedback can lead individuals to believe they can obtain greater desired states, resulting in upward goal revision. This process is known as discrepancy production. Without discrepancy production, agents would cease to self-regulate once they obtain their goals (Bandura, 1989).

In addition to modulating goal difficulty, humans revise content goals in response to environmental triggers. Senko and Harackiewicz (2005) showed that poor exam performance in the classroom can prompt students to decrease in both trait learning goal orientation and performance-approach goal orientation while increasing in performance-avoidance goal orientation. This pattern indicates switching from learning goal orientation and performance-approach goal orientation to performance-avoid goal orientation. The authors speculated that goal content adaptation stems from a decrease in perceived competence stemming from the negative feedback.

Strategy selection and adaptation. Another phenomenon that is fundamental to self-regulation is strategy selection and adaptation (Senko & Harackiewicz, 2005). Strategies are *a*

means to achieve endpoints and a focus of attention (Scholer & Higgins, 2008). They are critical to performance, as more effective strategy choices result in greater performance. Individuals can amend or replace strategies over time as they change their focus of attention. Indeed, most self-regulatory theories such as active learning systems, social-cognitive theory, control theory and the strategic learning model, recognize that individuals adjust or select new strategies to adapt (Bandura, 1989; Carver & Scheier, 1982; Kozlowski, Toney et al., 2001; Weinstein, Husman, & Dierking, 2000; Zimmerman, 1999). Testing control theory, for example, Lord and Campion (1982) found that students in the classroom context change strategies (e.g., allocate more effort) in response to negative feedback on their exam.

Environment changes combined with metacognitive skill can result in strategy changes (Kozlowski, Toney et al., 2001; Zimmerman, 1999). Metacognition involves having knowledge of and control over one's cognitions (Flavell, 1979) and encompasses planning, monitoring, evaluating and revising goal-directed behavior (Karoly, 1993) such as strategies. Those with metacognitive skill can monitor their progress, determine when they are not performing well, and adapt their strategies to improve performance (social-cognitive model; Zimmerman, 1999). Specifically, the extent to which individuals monitor past strategy selections and attribute them to performance outcomes drives future strategy selections. Changes in the environment can prompt individuals to recalibrate their understanding of what strategies are most effective, resulting in new strategy choices. In this way, environmental changes and metacognition can lead to changes in strategy choices.

Dynamic self-regulatory theories. Processes such as changes in strategies and goals are key to adaptive performance, which is linked to job performance. As such, theories that can explain dynamic processes are best positioned to understand performance. Indeed, self-

regulatory theories such as social-cognitive theory, control theory, and goal setting are best positioned to explain goal achievement and performance outcomes, because they capture dynamic processes.

The social-cognitive model, for example, is iterative. Zimmerman (1999) refers to self-regulation as self-generated feelings, thoughts, and behaviors that are cyclically adapted to achieve goals. Self-regulation can be divided into three phases: (1) forethought, (2) performance or volitional control, and (3) self-reflection (Zimmerman, 1999). The forethought phase encompasses motivational beliefs and processes such as strategic planning that influence performance. Processes and beliefs in the forethought phase influence performance in the volitional control phase, where individuals attempt to maximize attention to the task and optimize performance. Individuals then compare their performance level to the goal state and identify causes of past performance episodes in the self-reflection phase. In turn, processes in the self-reflection phase cycle back to affect processes and beliefs in subsequent forethought phases, resulting in implications for subsequent motivational beliefs, efforts, and self-reflections.

Due to its iterative nature, social-cognitive theory is well positioned to understand positive feedback cycles at work that may be responsible for goal achievement and performance in the long run. As one example, employees may enter the forethought phase with moderate to low self-efficacy, prompting them to contribute minimal effort in the volitional control phase and resulting in mediocre feedback ratings. Goal-performance comparisons in the reflection phase may result in discouragement and repeated reductions in self-efficacy and performance. As the process repeats, the employee can suffer substantial losses to performance levels over short time periods.

Due to its cyclical nature, control theory is another framework that is well positioned to understanding work mechanisms and outcomes. Control theory captures dynamics in goal pursuit (Carver & Scheier, 1982). According to this theory, people set goals and receive feedback relative to these goals. Goals and feedback are then compared in what is known as the comparator. Cognitive, affective, and motivational reactions result from this comparison, leading to implications for performance. Performance levels in turn influence future goals and performance outcomes. The iterative nature of social-cognitive theory enhances understanding of negative feedback cycles. For instance, at first, workers may exert great effort when experiencing moderate negative discrepancies. However, when getting close to obtaining their goals later on, they may exert less effort. In this way, the need for effort decreases as humans inch towards achieving their goals.

Even theories that initially omit temporal considerations (e.g., goal-setting theory) are revised to incorporate such dynamics, resulting in greater theoretical precision. Goal-setting theory, for example, states that challenging, realistic, and specific goals lead to greater performance than vague "do your best" goals (Locke & Latham, 2002). Recognizing that time is critical to the lives of employees, Fried & Slowik (2004) integrate time into the three main components of goal-setting theory: Goal difficulty, goal attainability, and goal specificity. Contrary to the belief that difficult goals are uniformly more motivating than easy goals, the authors theorized that the effects of goal difficulty are moderated by the temporal context. For instance, easy or moderate goals may motivate high effort levels when they are perceived as necessary steps to obtaining more difficult goals. Capturing temporal considerations will bring about a more nuanced understanding of the effects of goal specificity. For example, "do your best goals" are more adaptive than specific goals in the exploration and learning stages, whereas

more specific goals are best in other stages. Another tenet of goal-setting theory is that attainable goals are more motivating than unrealistic goals. This tenet, however, changes when incorporating temporal considerations. Low attainability goals may be motivating if failure associated with these goals is temporary. Also, those with future time orientations are more likely to raise goals even after initial failure, because they strive to achieve success in the long-term rather than short term. In this way, temporal considerations give precision to goal-setting theory.

Summary. Theories that encompass dynamic processes are best suited to understanding and explaining important outcomes such as adaptive performance and job performance and the mechanisms responsible for those outcomes. In particular, goal and strategy adaptation are fundamental to self-regulation and are critical to understanding the process of goal obtainment, adaptive performance, and in turn job performance.

Review of Regulatory Focus Theory

Regulatory focus theory is one widely used self-regulatory theory that fails to clearly capture goal and strategy adaptation. The purpose of this section is to identify and address the lack of attention to dynamics in regulatory focus theory. First, I show that the three core features of regulatory focus theory can change over time. Second, I describe four contributions stemming from a dynamic theory of regulatory focus.

Description of regulatory focus theory. Before showing that core features of regulatory focus change over time, I provide a description of regulatory focus theory that explains the usefulness of regulatory focus across a variety of domains and disciplines, with an emphasis on its utility to understanding work outcomes like job performance.

According to regulatory focus theory, two fundamental yet different survival systems influence the type of goals individuals pursue. The promotion system concerns advancement, development, and nurturance. Those who have well-developed promotion systems are usually attentive to their hopes and wishes (i.e., ideal self) as compared to their current perception of themselves (i.e., the actual self), in other words, their actual-ideal discrepancy (Higgins, 1996). Pains like sadness and disappointment can emerge from a large actual-ideal discrepancy. Pleasures such as excitement can emerge when actual-ideal discrepancies decrease. The function of the promotion system is to regulate pains and pleasures stemming from actual-ideal discrepancies (Higgins, 1996). Overall, a promotion orientation tends to foster an eagerness strategy—known as a focus on "hits" and attention to speed (Higgins, 1997).

The prevention system concerns safety, needs, and obligations. Those who have well-developed prevention systems are usually attentive to social expectations and attributes they ought to possess as compared with their actual perception of themself. In other words, the *Ought-Actual discrepancy* is salient. The presence of negative outcomes stemming from large actual-ought discrepancies can result in nervous and tense emotions reflecting pain. The absence of negative outcomes can produce feelings of calm and relaxation. The purpose of the prevention system is to regulate pains and pleasures stemming from actual-ought discrepancies (Higgins, 1996). Prevention systems tend to foster vigilance strategies—known as a focus on avoiding errors of commission and attention to accuracy (Higgins, 1997).

When individuals pair their regulatory focus with the appropriate strategy, they experience regulatory fit, resulting in them 'feeling right' and exhibiting high motivation and performance (Higgins, 2000). However, when regulatory focus and strategy are misaligned (e.g.,

promotion focus and vigilance strategy), individuals experience regulatory misfit, which can be detrimental to effort and performance (Higgins, 2000)

There has been a recent explosion in regulatory focus research (Gorman, Meriac, Overstreet, Apodaca, Mcintyre, Park, & Bodbey, 2012; Lanaj et al., 2012) and blossoming scholarship in a variety of goal attainment domains including smoking cessation and weight loss (Baldwin, Rothman, Hertel, Linde, Jeffrey, Finch & Lando, 2006), consumer product purchasing (Pham & Chang, 2010), self-regulating behavior during social interactions (Trawalter & Richeson, 2006), and negotiations (Appelt & Higgins, 2010). Moreover, regulatory focus research appears across many disciplines, including social psychology (e.g., Trawalter & Richeson, 2006), cognitive psychology (e.g., Maddox, Baldwin, & Markman, 2006; Markman, Maddox, Worthy, & Baldwin, 2007), and industrial and organizational psychology (e.g., Johnson, Chang & Yang, 2010).

Regulatory focus and performance. Regulatory focus theory has proven useful for predicting and understanding performance. Eagerness and vigilance strategies are partially responsible for the effects of regulatory focus on performance (Lanaj et al., 2012). For example, imagine a salesperson that is attempting to sell as much paper as possible to *new* clients. In this situation, a promotion focus, which often elicits an eagerness strategy, would underlie performance. On the other hand, prevention focus and corresponding vigilance strategy might relate to performance when a salesperson is trying to avoid losing the business of extremely valued clients.

Using a meta-analysis to synthesize research from 97 articles, Lanaj et al. (2012) used correlations, incremental analysis and relative weights to examine the effects of regulatory focus on performance outcomes above and beyond other predictors. They found that regulatory focus

influences task performance, organizational citizenship behavior (OCB) and counterproductive work behavior (CWB). Specifically, promotion focus is positively related to task performance (r = .28) while prevention focus is unrelated to task performance (r = .01). Regulatory focus explains 14 percent variance in task performance *after* accounting for goal orientation, the big five, and self-efficacy, which explain a combined 41 percent of the variance. Promotion focus is positively related to OCB (r = .30); this relationship was significantly stronger than the relationship between prevention focus and OCB (r = -.04). After controlling for the big five, positive affect and negative affect, job satisfaction and organizational commitment that explain 26 percent variance in OCB, regulatory focus explains an additional 17 percent variance in OCB. Moreover, work-related promotion and prevention explain more variance in OCB than any other predictors examined. Finally, the authors found that prevention focus relates positively to CWB (r = .25); this relationship is significantly stronger than the link between promotion focus and CWB (r = -.19). After controlling for big five, positive affect and negative affect, organizational commitment and job satisfaction that collectively explains 40 percent of variance in CWB, regulatory focus explains an additional 27 percent of variance in CWB.

Core components change over time. Having established that regulatory focus is useful for understanding performance, I now show that core features of regulatory focus change over time. Showing the malleability of these core features is a necessary first step to supporting a dynamic theory of regulatory focus. In what follows, I show that humans adapt state regulatory focus, strategies, and regulatory fit. I begin by differentiating trait and state regulatory focus.

Trait versus state: implications for malleability. Trait regulatory focus is chronic and assumed to be stable in adults (Higgins, 1997). Chronic regulatory focus develops in childhood as a partial result of parenting. Researchers have measured dispositional regulatory focus using

survey methodology. For instance, Wallace, Johnson, and Frazier (2009) validated a commonly used measure of regulatory focus that is specific to work. Lockwood, Jordan, and Kunda (2002) created and validated a regulatory focus scale, focused on the academic context. Finally, Neubert, Kacmar, Carlson, Chonko, and Roberts (2008) validated a general regulatory focus scale.

State regulatory focus is a concern with security or safety or a concern with advancement and nurturance that is cued by the environment (Aziz, 2008). Much research, particularly experiments, uses *state* regulatory focus in connecting regulatory focus theory to behavior. Scholars have manipulated state regulatory focus in the laboratory by having participants write about their hopes and aspirations versus their duties and obligations (Hong & Lee, 2008; Lisjak, Molden & Lee, 2003; Scholer, Stroessner, & Higgins, 2008). Commonly, experimenters orient participants to a focus on negative or positive outcomes by telling them that at the end of the experiment they will either lose (prevention focus) or gain (promotion focus) a chance at entering a raffle based on their performance (e.g., Lisjak, Molden & Lee, 2003). Dimotakis, Davison, and Hollenbeck (2012) induced regulatory focus using different task frames. To manipulate prevention orientation, the experimenter told participants to defend their territory from incoming attack. To manipulate promotion orientation, the experimenter told participants to acquire another territory. Imagining scenarios that are more consistent with a focus on either promotion or prevention has also induced state regulatory focus (Van-Dijk & Kluger, 2004). These successful inductions provide direct support for the malleability of state regulatory.

Patterns of change in state regulatory focus. There has been some research into the pattern of changes in state regulatory focus over time. Forster, Higgins, and Idson (1998), for example, investigated the role of dispositional and state regulatory focus in influencing the slope

of approach and avoidance motivation as the goal draws nearer. In study 1, participants faced a goal of completing two sets of 7 anagrams. While doing so, participants pressed upward (measuring avoidance motivation) or downward (measuring approach motivation) on a skin conductance machine. Dispositional regulatory focus was surveyed. The authors found that individuals pressed harder on the conductance machine as the goal drew nearer, signaling an increase in motivational strength. More importantly, a promotion focus led to a greater increase in approach motivation over time than an avoidance motivation. Conversely, a prevention focus led to a greater increase in avoidance motivation over time than an approach motivation. The authors manipulated state regulatory focus in study 2, but otherwise used the same methodology as study 1. They again reached the same conclusion. Overall the study points to an interesting pattern of findings in regards to approach and avoidance motivation over time. However, as the main outcome was motivational strength, not state regulatory focus, one cannot draw strong conclusions in regards to why individuals might evolve their state regulatory focus over time.

Pennington and Roese (2003) investigated changes in the level of concern for promotion and prevention goals over time. In study 1, the researcher distributed surveys to students two weeks before and the day of the midterm. The authors found that students had greater promotion concerns two weeks before the midterm than the day of the midterm. In other words, salience of promotion concerns decreased as the exam approached. In contrast, prevention concerns remained constant over time. In study 2, the researchers manipulated the subjective experience of time. The objective time until exam was the same for all participants (i.e., 3.5 weeks), but researchers framed the exam as either near or relatively distant. Participants placed less importance on promotion goals when the exam was framed as near compared to when the exam was framed as far away. Similar to study 1, the importance of the prevention goal remained

constant. Overall, the study provides support for systematic changes in state regulatory focus over time. However, the investigation did not advance understanding as to why individuals might engage in state regulatory focus adaptation over time.

Regulatory focus switching underlies performance. This section is devoted to understanding why agents may actively adapt state regulatory focus. I show in this section that promotion and prevention focus both have divergent characteristics—features that produce positive outcomes in some instances and negative outcomes in others (Scholer & Higgins, 2012). These divergent characteristics are key to understanding why agents may actively adapt state regulatory focus.

Characteristics of promotion system. One characteristic of strong promotion systems is high optimism and self-esteem, which protects people from the negative motivational consequences of failure. For example, De Lange and Van Knippenberg (2009) found that promotion-focused individuals, who are less distracted by negative feelings after making errors, are buffered from the negative impact of errors on performance in subsequent trials.

As another defining characteristic, those with strong promotion systems strive to make gains, seeking greater possibilities and opportunities (Scholer & Higgins, 2012). Making gains can be thought of as achieving some sort of desired state. One example is the desire to possess the greatest and most up to date technology. Unlike those with strong prevention systems, those with strong promotion systems hope to have the most up to date technology and are more likely to use new technology at work. Compared to prevention-oriented individuals, promotion-oriented individuals tend to hold more cutting edge technological products. Moreover, to pursue a highly valued activity or incentive, promotion-focused people are more willing to withdraw

from a current activity or incentive compared to prevention-focused people. In this way, promotion-focused people prefer making gains even at expense of lows.

Promotion-focused individuals gravitate towards exploration, meaning they consider multiple alternatives when making decisions (Scholer & Higgins, 2012). Unlike prevention-oriented individuals, promotion-oriented individuals can choose one option without discounting certain benefits of alternative options. For example, in the context of consumer purchasing, promotion-oriented people can decide to purchase one product while seeing the benefit of alternative products, indicating that they considered multiple options. In the context of committed romantic relationships, those with strong promotion systems evaluate romantic alternatives more highly than those with strong prevention systems.

Finally, those with strong promotion systems can see the forest beyond the trees. This means that they tend to use global processing to move beyond the small details of a specific situation and see the larger pattern of events. For example, a basketball player may go beyond local processing of events, such as noticing the shooting techniques of opponents, and instead, use global processes to notice that the opposing team is employing a zone defense that can be countered by quick ball movement.

Characteristics of prevention system. Prevention can be thought of as the mirror image of promotion focus with respect to the above characteristics (Scholer & Higgins, 2012). Prevention-oriented individuals prefer the status quo and are reluctant to take risks so as to protect themselves against potential losses. In other words, prevention-oriented people seek to avoid losing some sort of desired state or object that they currently possess. For example, they are more reluctant to adopt new technology than promotion-focused people.

Those with well-developed prevention systems are highly committed to one course of action or option. Compared to promotion-focused individuals, prevention-focused individuals provide more negative evaluations of options, such as commenting that one brand of juice is too expensive. Those high in prevention orientation are very detail oriented, but sometimes they miss the bigger picture. This means that prevention-focused individuals tend to use local processing. They tend to notice small but potentially important details, rather than picking up on larger patterns. For example, when shooting a three point shot, a basketball player may notice that he or she is stepping on the three point line, prompting the player to move back. However, they may miss the overarching defensive strategy employed by the opposing team.

Tradeoffs. Promotion or prevention qualities can be adaptive depending on the circumstances. The product development cycle provides one example of the need to switch between promotion and prevention. In the beginning stages of product development, the promotion characteristic of exploring many ideas is generally more adaptive than the prevention characteristic of committing to one idea without considering other options. Deciding on one idea too quickly may prevent effective brainstorming. Conversely, when it is time to develop the product, committing to one or two of the most promising and feasible ideas (i.e., a prevention characteristic) is more effective than continuing to explore and build many different products (i.e., a promotion characteristic), which can drain financial resources.

Scholer and Higgins (2012), who reviewed the divergent characteristics of promotion and prevention, concluded that regulatory focus adaptation might be necessary to balance the advantages and disadvantages of promotion and prevention across situations (Scholer & Higgins, 2012). Because a promotion focus is most effective in some situations and prevention focus is most effective in others, adapting regulatory focus to fit the situation may underlie performance

(Scholer & Higgins, 2012). In essence, this would mean adapting to new situations by switching from a strong promotion, weak prevention profile to a high prevention, low promotion profile or vice versa.

As I argue in the next four paragraphs, switching from strong promotion and weak prevention to strong prevention and weak promotion is more effective than holding a strong promotion and strong prevention profile across all situations. Findings from Fuglestad, Rothman, and Jeffery (2008) combined with inferences about advantages and disadvantages of promotion and prevention indirectly support the effectiveness of switching as compared to holding a strong promotion and strong prevention profile across all situations. Fuglestad, Rothman, and Jeffery (2008) investigated the psychological determinants of success in the initiation and maintenance phases of smoking cessation and weight loss. According to the author, the initiation phase involves a behavioral change (e.g., smoking cessation) in which success may require characteristics of a promotion focus, such as preferences for making a change rather than preferring the status quo, and desires to explore multiple courses of action.

In contrast, maintenance occurs when a new pattern of behavior has already been established. As such, success in this stage requires characteristics of a prevention focus including preferences for the status quo, high commitment to one course of action, and sensitivity to failure and potential losses.

Findings from Fuglestad, Rothman, and Jeffery (2008) suggest that high promotion is necessary for the initiation stage whereas a high prevention is necessary for the maintenance stage. Importantly, the authors failed to examine regulatory focus profiles; therefore, there are two potential candidates for smoothly and successfully progressing across the initiation and maintenance phases. The first candidate is beginning by having a strong promotion and weak

prevention, and then ending by possessing a weak promotion and strong prevention. The second candidate is having both a strong promotion and strong prevention across both initiation and maintenance phases.

I argue for the first possibility, noting that there are disadvantages to holding strong promotion or strong prevention orientation in inappropriate contexts. For example, those with prevention systems are sensitive to failure, they tend to avoid exploration, and prefer the status quo. These characteristics of prevention systems may undermine the initiation of smoking cessation, as initiation requires motivation to make gains. In other words, weak prevention is better for initiation than strong prevention. Consequently, a strong promotion, weak prevention profile would lead to greater performance gains than a strong promotion, strong prevention profile.

Conversely, to be successful in the maintenance stage, one must be vigilant to avoid potential losses and have a firm commitment to continue the status quo. Those with a high promotion orientation would tend to have less firm commitment to the status quo (i.e., maintenance) than those with a weak promotion orientation. As such, those holding a high prevention and low promotion profile would be best suited to the maintenance phase than those holding a high prevention and high promotion profile.

In sum, successful regulatory focus manipulations and preliminary research support the notion that humans engage in regulatory focus adaptation. State regulatory focus adaptation may serve to balance the advantageous and disadvantages of promotion and prevention across situations.

Malleability of strategies. As apparent in the last section, humans adapt state regulatory focus over time. Because state regulatory focus is linked to strategies, people may adapt

strategies as state regulatory focus changes over time. It is important to understand the essence of strategies in order to know how they might change over time.

The essence of strategies. An eagerness strategy is a distribution of attentional resources to speed (i.e., achieving "hits") (Camacho, Higgins, & Luger, 2003). An example of a "hit" is correctly deciding to shoot a hostile target. A vigilance strategy is a distribution of attentional resources or focus on accuracy and being careful (i.e., aiming for correct rejections and avoiding false alarms; Camacho, Higgins, & Luger, 2003). An example of a correct rejection is correctly deciding to refrain from shooting a peaceful target. An example of a false alarm is erroneously deciding to shoot a peaceful target. Hits, correct rejections, and false alarms all stem from signal detection theory, which is used to conceptualize and operationalize strategy choice (Camacho, Higgins, & Luger, 2003) and has been tested across many areas of study (Wickens, 2002).

Strategies are distinct from state regulatory focus in that they focus on means rather than ends. There has been some confusion in the literature regarding the distinction between strategies and tactics (Scholer & Higgins, 2008). Signal detection theory can be used to conceptualize tactics, yet tactics differ from strategies in that tactics are specific instantiations of strategy in a given context (Scholer & Higgins, 2008). Strategies capture an aggregate strategy based on multiple decisions, whereas tactics can be thought of at the behavioral level and operationalized as a single decision (Scholer & Higgins, 2008).

The necessity of strategy adaptation. Humans possess limited attentional resources to allocate to eagerness and vigilance strategies, underlying the need to switch between strategies. The need to switch strategies is a function of tradeoffs between accuracy and speed across various tasks (for a review, see Aperjis, Huberman, & Wu, 2011). Focusing more on speed tends to decrease accuracy. Conversely, focusing more on accuracy tends to decrease speed.

To communicate the need to switch between strategies, I show that there are three ways to distribute attention across strategies. First, one could distribute more resources to achieving 'hits' and speed rather than accuracy (i.e., eagerness strategy). Second, one could distribute more resources to accuracy and avoiding false alarms such as avoiding shooting a peaceful target through inaction rather than speed (i.e., vigilance strategy). Lastly, one could equally distribute attentional resources across speed and accuracy. This would be considered neither an eagerness nor vigilance strategy, as eagerness and vigilance strategies imply an unequal distribution of attentional resources. I term this strategy a "neutral strategy". Because people possess limited resources, neutral strategies would not lead to greater speed than eagerness strategies, nor would it cultivate greater accuracy then vigilance strategies.

The need to switch between strategies can be inferred from the example of a surgeon operating on a patient. When facing an extremely delicate surgery, focusing more attention on accuracy will enable the surgeon to achieve greater performance outcomes than focusing less attention to accuracy. Therefore, to maximize attention to accuracy, the surgeon should distribute more attention to accuracy than speed (i.e., use an eagerness strategy). In contrast, when performing surgery in which time is short and precision is less critical, distributing more attention to speed than accuracy will yield greater performance outcomes.

Similar to regulatory focus adaptation, strategy adaptation may be necessary to balance the advantages and disadvantages of eagerness and vigilance across situations (Scholer & Higgins, 2012). Eagerness is advantageous when errors are not very costly and quick progress is important. Vigilance is advantageous when errors *are* very costly and fast progress is less important.

Changing task incentives can prompt strategy adaptation. Different situations may hold different *task incentives*. Task incentive is an environmental factor that determines the effectiveness of eagerness and vigilance strategies. For example, a vigilance task incentive could be present when restaurant employees are carefully preparing the restaurant for inspection. In this case, being vigilant to avoid unsanitary conditions is a more effective strategy than using eagerness means to prepare the restaurant as quickly as possible. In this case, the presence of a vigilance incentive makes vigilance strategies more effective than eagerness strategies. Conversely, an eagerness task incentive is present when cooks must work quickly to feed an overcrowded restaurant. In this case, employees may want to focus on achieving hits, even at the expense of making some errors. In this instance, an eagerness strategy is more effective than being vigilant, which can result in errors of omission—doing nothing when some sort of action is required. Eagerness task incentives make eagerness strategies more effective than vigilant strategies.

The role of metacognition. The ability to adapt strategies is consistent with mechanisms in self-regulation theory such as metacognition. Many theories of self-regulation (e.g., social-cognitive theory) rely on metacognition in explaining internal changes in response to environmental fluctuations. Metacognition is the self-observation of cognitive actions and includes monitoring the connection between past strategies and resulting outcomes (Zimmerman, 1999). As individuals link past performance outcomes to particular strategy choices, they can understand which strategies are currently most effective. Hence, metacognition allows individuals to detect task incentives through trial and error and ascertain which strategies are most effective given the current task incentive. New environments (e.g., a different task

incentive) can prompt individuals to recalibrate their understanding of what strategy is most effective, resulting in strategy adaptation.

Changes in regulatory fit. As shown in the previous sections, humans adapt state regulatory focus and strategy over time. This results in two potential outcomes regarding the malleability of regulatory fit. First, if changes in strategy always co-occur with changes in state regulatory focus, then the degree of regulatory fit will remain constant over time. Second, if changes in strategy do not always co-occur with changes in state regulatory focus, then individuals will experience changes in the degree of regulatory fit over time. In this section, I argue for the latter outcome and show that two kinds of regulatory fit—(1) fit between dispositional regulatory focus and strategy and (2) fit between state regulatory focus and strategy—can change over time.

There are two types of regulatory fit, both of which may change over time. First, regulatory fit between trait regulatory focus and strategy can change over time. This claim is derived from two premises. First, strategies change over time. Second, trait regulatory focus is chronic and thought to be stable in adults (Higgins, 1997; Higgins & Silberman, 1998). Thus, as strategy changes while dispositional regulatory focus remains constant, people can shift from experiencing regulatory fit to experiencing regulatory misfit or vice versa.

Preliminary evidence. Regulatory fit between state regulatory focus and strategy can also change over time. This is because fit may be most effective in some situations but not others. Providing initial support for this claim, Markman, Maddox, Worthy, and Baldwin (2007) investigated the role of regulatory fit versus misfit in classification learning. Individuals use two strategies to make classifications. First, hypothesis testing involves generating and testing explicit hypotheses about rules for categorization. Second, procedural-based learning involves

learning that item belongs to a category based on similarity to other items. To examine the role of regulatory fit in classification learning, the authors manipulated state regulatory focus. Participants in the promotion condition had to perform at a certain level to win a raffle ticket. Participants in the prevention condition had to perform at a certain level in order to prevent losing the raffle ticket. The authors also manipulated task structure. Participants in the approach task structure condition gained 2 points for correct responses and 0 points for incorrect responses. Participants in the avoidance task structure condition lost 3 points for errors and gained 1 point for correct responses. The authors found that regulatory fit leads to greater hypothesis testing and in turn greater accuracy on tasks in which hypothesis testing facilitates accuracy. Conversely, regulatory misfit leads to greater accuracy than regulatory fit when participants perform a task in which hypothesis testing undermines accuracy. In this way, the effect of regulatory fit versus misfit on accuracy is contingent on whether hypothesis testing leads to greater or lesser accuracy on a given task.

As one switches tasks, the comparative benefits of regulatory fit versus regulatory misfit may also change. To perform tasks that require learners to refine understanding of a rule, learners must use procedural-based learning and not hypothesis testing (Markman et al., 2007), for hypothesis testing may undermine accuracy. On the other hand, when performing tasks that require individuals to search for an entirely new rule for categorization, hypothesis testing is necessary (Markman et al., 2007). These different situations can fluctuate over time, as people transition from needing to refine understanding of a rule to needing to find an entirely new rule. Thus[1], humans may switch from regulatory fit to regulatory misfit or vice versa in order to maximize accuracy across tasks over time.

[1] One limitation of this argument should be mentioned. Markman, Maddox, Worthy, and Baldwin (2007) manipulated task structure and strategies in inducing regulatory misfit versus regulatory fit. Manipulating task

In addition to characteristics of the task, the valence of stimuli can also influence one's preference for regulatory fit or regulatory misfit. Scholer and Higgins (2008) suggest that when individuals face negative stimuli (e.g., threatening words), regulatory focus can be served by tactics—specific instantiations of strategies in a given context—that do not fit with regulatory focus. Investigating this idea, Scholer, Stroessner, and Higgins (2008) used a 2 (promotion vs. prevention) X 2 (positive vs. negative stimuli) design. Participants viewed 84 negative or 84 positive words on a computer screen, one third of which were related to promotion or prevention. The experimenter in studies 1-3 manipulated regulatory focus between subjects; the investigator in studies 4-6 manipulated regulatory focus within-subjects. Across all six studies, the authors found that when negative stimuli are present, regulatory focus can be served by tactics that do not fit. Specifically, when prevention-focused individuals face negative stimuli, they use a riskier tactic[2] than promotion-focused individuals to ensure that negative stimuli are correctly identified.

Findings in Scholer et al. (2008) point to the notion that valance of stimuli may moderate the effects of regulatory fit. Scholer et al. (2008) found that humans choose mismatching tactics when facing negative stimuli. However, most scholars generally find that participants choose regulatory fit when they are faced with positive stimuli (Scholer & Higgins, 2008). Thus, as valence of stimuli in the environment changes over time, the preference for regulatory fit or regulatory misfit may also change.

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structure is not the same as manipulating strategy, but the two are similar in that an approach task structure is likely to induce an eagerness strategy, whereas an avoidance task structure is likely to induce a vigilance strategy. Thus, this study points to the possibility that regulatory fit between state regulatory focus and strategies change over time.

[2] One aspect of this study limits the strength of the conclusion that can be reached from this article. That is—the authors examined fit between regulatory focus and tactics rather than fit between regulatory focus and strategies—which is the focus of this section. Although the authors used *tactics*, it is possible these results generalize to fit between state regulatory focus and strategies, because tactics serve strategies and are specific instantiations of strategies in given context. Furthermore, approach tactics (i.e., risky) tend to serve eagerness strategies, and avoidance tactics (i.e., conservative) tend to serve vigilance strategies.

Differing rates of change. The possibility for changes in regulatory fit between state regulatory focus and eagerness can also be derived from the argument that strategies change at a quicker rate than state regulatory focus, leading to changes in fit over time. Strategies change at a quicker rate than state regulatory as can be seem from the understanding that strategies are a lower-level goal than state regulatory focus. Strategies are referred to as a focus of attention on hits versus correct rejections. They can be thought of as the aggregation of decisions to engage in action (in order to achieve hits) or refrain from acting (in order to achieve correct rejections). State regulatory, on the other hand, captures higher-level goals like safety and responsibility versus development and advancement. These higher-level goals are more abstract than goals of achieving hits or correct rejections (Higgins, 1997).

The control theory framework supports the notion that abstract goals are more stable than less abstract goals. Lord, Diefendorff, Schmidt, and Hall (2010) rely on control theory to differentiate aspects of self-regulatory theories by cycle time and level of abstraction. Cycle time is the time required for information to cycle through the feedback loop in the control theory framework. The highest cycle level focuses on possible selves. These abstract goals regarding one's self may take months or years before the one cycle is complete. Humans also have intermediate cycle levels that take minutes, hours, or days to cycle. Examples of goals in the intermediate cycle include trying to finish a specific task, which is a less abstract goal than general wishes to possess certain attributes. Goals in the low cycle level are even more specific; examples include reading a one-page document. The takeaway message from the different cycle levels is that goal level abstraction and cycle level are inversely related. Higher-level abstraction and low cycle levels coincide. Because more abstract goals take longer to cycle through the feedback loop, they change more slowly than lower-level goals.

If dynamic environmental factors[3] such as task incentives can prompt faster changes in strategy than state regulatory focus, individuals would experience momentary misfit in the transition back to regulatory fit. For example, a basketball player may have a state promotion focus, because the team has been losing badly most of the game. In order to succeed the basketball player must focus on putting up as many shots as possible (i.e., use eagerness strategy). However, towards the end of the game, the team takes the lead. To maximize performance in this new situation, the basketball player must use a vigilance strategy and be conservative to avoid turnovers and other costly mistakes. The basketball player employs the appropriate vigilance strategy but experiences regulatory misfit, as his or her state regulatory focus remains a promotion orientation. At this instance, the player experiences momentary misfit between state promotion focus and vigilance. However, as the game continues, the player's state regulatory focus finally changes from promotion to prevention to match his or her newfound vigilance strategy. In sum, the player transitions from experiencing regulatory fit to experiencing regulatory misfit as the situation prompts him or her to employ a vigilance strategy[4]. As the player's state regulatory focus begins to track the change in strategy, the player again experiences regulatory fit.

Summary. Taken together, research and reasoning supports the notion that people experience changes in regulatory fit versus misfit between state regulatory focus and eagerness

[3] Higgins (2000) discusses multiple kinds of fit. To clarify, we refer to fit between state regulatory focus and strategy (also referred to as eagerness strategy) in this paragraph. Although dynamic environmental factors are involved, we view them as directly influencing one's strategy. Therefore, we are focusing on the regulatory fit between state regulatory focus and strategy.

[4] One important counter question to this line of reasoning is the following: "If strategy is more flexible and easier to change, then why would it lead to changes in regulatory focus?" Because a strategy is easier to change, a situational change could incentivize a new strategy, resulting in people switching their strategy (e.g., greater eagerness). This change in strategy, however, may result in regulatory misfit if the state regulatory focus remains as state prevention. If the change in situation continues to incentivize eagerness, then an individual may decide to change their state regulatory focus in order to experience regulatory fit. In order to experience regulatory fit, they would likely change their state regulatory focus and *not* the strategy because changing the strategy would result in a decline in performance (due to the situational factor now incentivizing eagerness).

over time. The effectiveness of regulatory fit versus misfit could change as one switches from tasks that require hypothesis testing to tasks in which hypothesis testing undermines accuracy. Also, the preference for regulatory fit or misfit may change over time as stimuli shifts in valence. Finally, changes in regulatory fit versus misfit can be derived from the argument that (1) humans adapt strategies and state regulatory focus over time and (2) strategies change at a faster rate than changes in state regulatory focus.

Because core features of regulatory fit change over time, it is important to understand the origins of these changes, which is not sufficiently specified by theory. "If promotion and prevention foci do indeed fluctuate over time, then the next logical step is to identify the causes and effects of such fluctuations" (Lanaj et al., 2012, p. 1026). This quotation, highlighting the need to address the origin of changes in regulatory focus, leads us to the contributions.

Contribution section. Four contributions stem from a dynamic approach to regulatory focus theory that fully captures the origin and consequences of changes in state regulatory focus, strategies, and regulatory fit over time. I will describe the question(s) underlying each contribution and support the novelty and importance of each contribution.

Contribution 1. Beginning with the origin of these changes, the first contribution involves the following questions: (1) what are the origins (personal, environmental, and person and environment interaction) of within subject changes in regulatory focus and strategy? (2) Do strategies change more quickly than state regulatory focus or vice versa?

Although strategy and goal adaptation are fundamental to self-regulation, regulatory focus theory is not positioned to understand the origins of variability in strategies and state regulatory focus over time. The theory does not specify the relative malleability of strategy and state regulatory focus. Seminal theoretical pieces (e.g., Higgins, 2000; Higgins, 1997), literature

reviews (e.g., Scholer & Higgins, 2008), and meta-analyses (i.e., Gorman et al., 2012; Lanaj et al., 2012) describe regulatory focus theory, but they do not present or describe a model that captures the origin of changes in state regulatory focus and strategy over time. Even outside of these seminal pieces, I am unaware of any theoretical descriptions that explicitly capture the process of strategy and regulatory focus adaptation, or the origin of these fluctuations.

The lack of attention to environmental factors in theory and empirical research (Dimotakis et al., 2012; Lanaj et al., 2012) may prevent theories from being able to capture the origin of switches between promotion and prevention or between eagerness and vigilance. Another theoretical limitation to understanding the origin of changes in state regulatory focus and strategy is that personal mechanisms (or person times situation interactions) that have potential to explain fluctuations in state regulatory focus and strategy are absent from regulatory focus theory. Scholars believe state regulatory focus is induced via manipulations (Aziz, 2008). Neither personal factors nor person and situation interactions are presumed to play a role in influencing changes in state regulatory focus. However, this assumption does not reflect reality as the internal adaptation of goals and strategies are important self-regulatory functions, and in general, self-regulatory functions "are *personally* constructed from varied experiences *not* simply *environmentally* implanted" (Bandura, 1989, p. 1182). Simply put, the ability to adapt goals and strategies are not just a function of the environment, but also a function of personal processes.

Like theory, extant research has failed to investigate the origin of fluctuations in state regulatory focus and strategy. Pennington and Roese (2003) found that as the exam approached, students rated promotion concerns as more important two weeks before the midterm than the day of the midterm. However, rating the importance of promotion concerns is not the same as state promotion orientation. Moreover, the authors failed to examine the personal or environmental

origins of such fluctuations over time. As another example, Dimotakis et al. (2012) used task frames as environmental inductions of state regulatory focus. However, Dimotakis et al. (2012) could not identify predictors of changes in state regulatory focus over time, as task frames were manipulated between subjects and not within-subjects. Moreover, the authors failed to measure state regulatory focus, making it difficult to understand the effectiveness of task frames in inducing state regulatory focus. To my knowledge, the failure to measure state regulatory focus is true of studies that use environmental manipulations of state regulatory focus (e.g., Baldwin et al., 2006; Forster, Higgins, & Idson, 1998; Pennington & Roese, 2003). An important caveat here is that one could argue that certain manipulation checks serve as a measure of state regulatory focus. For example, the self-guide questionnaire by Higgins used reaction times to reflect the accessibility of traits associated with ideal and ought selves. There is some validity evidence for this measure given that manipulations of regulatory focus tend to influence the manipulation check in expected ways. However, to my knowledge, there has not been a systematic attempt to validate this measure. The lack of a valid measure of state regulatory focus makes it more difficult to fully understand the origins of state regulatory focus. Hence, extant research does not generate a complete understanding of the origin of state regulatory focus and strategy.

In sum, to uncover the origin of switching between promotion and prevention or between eagerness and vigilance and understand which of the two constructs are most malleable, theory must be extended to include environmental factors (e.g., task incentive), personal factors (e.g., metacognition), and interactions between person and situational predictors (e.g., task incentive times metacognition) of changes in state regulatory focus and strategy.

Contribution 2. Like contribution 1, contribution 2 involves questions about the dynamics of regulatory focus theory. Specifically, do people adapt their strategies and regulatory focus to achieve regulatory fit over time? If so, how does this process unfold—what is the causal direction between changes in state regulatory focus and changes in strategy?

Scholars generally view regulatory fit as a phenomenon that occurs between subjects. They assume that the causal direction is from regulatory focus to strategy—people choose strategies based on their dispositional or state regulatory focus (Higgins, 2000). We extend this conceptualization by viewing regulatory fit as a process that occurs within individuals over time. For example, as the environment changes, humans may change their strategy, which in turns prompts a change in state regulatory focus to achieve regulatory fit. In this way, dynamics of the environment may prompt a process of regulatory fit that occurs over time. Out of this process emerges a new possibility—that the direction of the relationship is not just from regulatory focus to strategy. Changes in strategy may prompt changes in state regulatory focus.

The argument for this conception of regulatory fit over time and the new causal direction can be inferred from the notion that some environmental factors may influence one's strategy but not immediately influence one's state regulatory focus. This is because strategies are likely more malleable and flexible to the environment than state regulatory focus as argued previously. As such, task incentives in the environment, such as the need to score baskets quickly, can prompt basketball players to quickly switch from a vigilance to eagerness strategy. Assuming that the strategy continues to be eagerness, the player may slowly change their state regulatory focus to be aligned with their strategy. Aligning state regulatory focus with the strategy allows the player to 'feel right' while still using the most effective strategy. However, this change in state regulatory focus may not happen right at the onset of the change in environmental factor,

because I argue that state regulatory focus is less malleable than strategy. From continual use of a new strategy, individuals may slowly change their state regulatory focus to match the strategy.

The notion that changes in strategy can influence changes in goals can be supported from research on priming. Shah and Kruglanski (2003) investigated bottom-up priming of goals by means. Across four studies, the authors found that means can prime the goals that they serve, resulting in positive implications for task performance and persistence. Taken together, there is preliminary support for the notion that regulatory fit can be viewed as a dynamic process whereby changes in strategy influence changes in state regulatory focus over time.

Contribution 3. Contribution three concerns the question: Can the processes of state regulatory focus and strategy adaptation account for variability in performance? Researchers largely fail to explain variance in performance outcomes due to within subject changes in strategy and state regulatory focus. Thus, if changes in state regulatory focus do indeed influence performance, then regulatory focus scholars are not harnessing the full power of regulatory focus theory in explaining performance.

Because (1) promotion versus prevention has important tradeoffs, as do eagerness versus vigilance, and (2) certain state regulatory focus or strategies are a better fit in certain situations (Scholer & Higgins, 2012)—individuals should be able to switch fluidly between promotion and prevention and between eagerness and vigilance to compensate for their relative weaknesses (Lanaj, Chang & Johnson, 2012; Scholer, 2012). This ability to switch between promotion and prevention or between eagerness and vigilance likely underlies performance.

Unfortunately, extant theory and research make it difficult to investigate the presence of strategy and state regulatory focus adaptation and its impact on performance, because environmental factors are largely absent. Experiments tend to use ‘neutral tasks’, such as

categorization tasks (e.g., Lisjak et al., 2012)—in which there is no difference in terms of the relative effectiveness of eagerness and vigilance strategies. If both vigilance and eagerness strategies result in similar performance outcomes, then there is no need to switch between the two. Without capturing switches in strategy in response to the environment, regulatory focus theory is limited in its ability to understand performance.

Contribution 4. Currently, regulatory focus theory and research only recognizes that individuals choose strategies based on 'what feels right' according to their dispositional or state regulatory focus (Higgins, 2000). We revise this assumption by incorporating an important tradeoff into regulatory focus theory—the tradeoff between 'what feels right' (i.e., regulatory fit) and 'what is most effective'. This takes us beyond the assumption that 'fit' is most desirable and refocuses regulatory focus theory on understanding the personal and environmental factors that determine the relationship between regulatory fit and performance.

One tradeoff, involving dispositional regulatory focus, could happen when environmental dynamics force one to use a strategy that misfits regulatory focus. For example, a surgeon has a dispositional promotion focus, but must perform a surgery in which carefulness and precision are extremely important, and speed is not necessary for success. To successfully perform the surgery, the surgeon must choose an eagerness strategy that misfits his or her dispositional regulatory focus.

A tradeoff between state regulatory focus and strategy is also possible. As argued previously, changes in state regulatory focus happen more slowly than changes in strategy. As such, environmental changes like shifts in task incentive could prompt individuals to change their strategy to remain effective, even though their state regulatory focus remains momentarily unchanged. This could result in momentary experiences of regulatory misfit.

By recognizing that people choose strategies not just based on fit but also based on their understanding of what strategies are most effective, regulatory focus is better positioned to understand job performance. By refocusing regulatory focus theory on the conditions (e.g., task incentive) and personal characteristics (e.g., metacognition) that determine the relationship between regulatory fit and performance, we can enhance the precision of regulatory focus theory in predicting and understanding performance.

Summary of self-regulatory review. By achieving the above contributions, I aim to extend theory to capture processes that are fundamental to self-regulation—the adaptation of strategies and regulatory focus goals over time. Theories of self-regulation should be set up to capture and explain dynamic processes (particularly goal and strategy adaptation) to fully explain the mechanisms responsible for goal achievement and performance. Components of regulatory focus theory change over time, yet regulatory focus theory fails to capture the dynamics of regulatory focus, strategy, and regulatory fit, leaving important questions unaddressed. For instance, what is the origin of fluctuations in components in regulatory focus theory? Can regulatory fit be conceptualized as a process that unfolds over time? Can variance in performance be attributed to changes in state regulatory focus and strategy? Do individuals face a tradeoff between 'what feels right' and 'what is most effective'?

Approach to Addressing Contributions

My approach to achieving these contributions is to test a dynamic model of regulatory focus that captures the origin (e.g., task incentive and metacognition) and outcomes (e.g., performance) of changes in state regulatory focus and strategies. This approach is in line with calls to do more dynamic research to understand and explain within subject changes in regulatory focus and strategy (e.g., Lanaj et al., 2012) and to uncover the adaptive response of fluid

switching between promotion and prevention that may occur in an attempt to unlock the advantages of state promotion and state prevention orientation (Scholer & Higgins, 2012).

Hypotheses

To achieve these contributions, I now present and support a dynamic model of regulatory focus. Before presenting the dynamic model, however, I will present and provide support for a static model that occurs at an initial time point. Figure 1 below shows the static model.

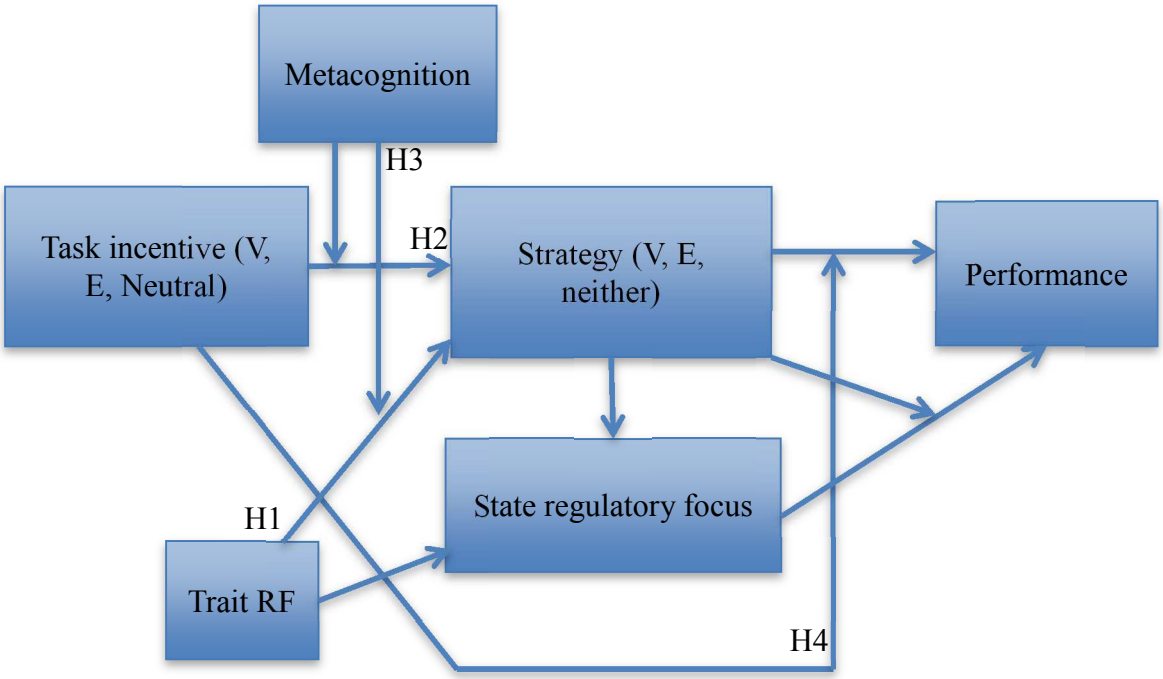

Figure 1. Expected relationships at time 1.[5]

Regulatory focus theory and research support the notion that individuals choose strategies that fit with their dispositional regulatory focus (Higgins, 2000). This leads us to the first hypothesis.

[5] Figure 1 displays relationships between variables at "time 1"—or the time directly following the manipulation of task incentive. The only exception to this is that trait regulatory focus would be measured at baseline (i.e., before time 1).

H1: Main effect of trait regulatory focus: Trait promotion focus will have a positive association with eagerness strategy; trait prevention focus will positively relate to vigilance.

Because most people engage in metacognition and monitor past strategies and performance to some extent, they are likely to have some idea of what strategy is most effective (Zimmerman, 1999). Thus, using metacognitive monitoring, individuals will tend to choose the strategy that they believe to be most effective irrespective of achieving regulatory fit. Thus, task incentives that reward a certain strategy are likely to have a greater influence on strategies than dispositional regulatory focus. Taken together, an eagerness task incentive will lead to an eagerness strategy and a vigilance task incentive will lead to a vigilance strategy.

H2: Main effect of task incentive on strategy choice

H2a: Task incentive will exert a positive and main effect on strategy choice, such that eagerness task incentives will lead to eagerness strategies and vigilance task incentives will lead to more use of vigilance strategies.

H2b: *Task incentive will account for more variance in strategy choice than dispositional regulatory focus.*

Metacognition involves thinking about strategy choices and therefore is critical to understanding what strategy is most effective in a given environment (Zimmerman, 1989). Individuals who possess low levels of metacognition will have a poorer understanding of what strategy (eagerness or vigilance) is most effective (given the current task incentive) than individuals who hold high metacognition. Because of the ambiguity regarding which strategy is most effective when metacognition is low, individuals will choose strategies that 'feel right' and fit their regulatory focus, rather than strategies that 'are most effective'—i.e., the ones that are incentivized by the task incentive.

H3a: Metacognition and trait regulatory focus will interact to influence strategy choice. Specifically, the influence of trait regulatory focus on strategy choice will be greater when metacognition is low than when it is high.

H3b: Although not incorporated into the model, we expect that greater metacognition will result in a greater likelihood that strategies will misfit with dispositional regulatory focus.

The effectiveness of a given strategy will be determined by the current task incentive, because participants aim to perform well and will possess some metacognitive skill that they will use to detect the current task incentive.

H4[6]*: Task incentive will interact with strategy choice to influence performance: Greater performance results when strategy choice is aligned with task incentive than when it is misaligned.*

Hypotheses about relationships incorporating change variables. The dynamic model (Figure 2 below) is comprised of hypotheses 5-11.

[6] *At first glance, it might seem odd that task incentive (IV) plays a direct role in affecting eagerness (H2) but also interacts with eagerness to influence performance (H4). We expect task incentive to play these dual roles because we do not expect a one to one correspondence between task incentive and eagerness. In other words, there will be variance across people with regards to the extent to which they adopt strategies that are congruent with the task incentive. Some individuals will display high congruence between eagerness and task incentive whereas others will not; this is the case for two reasons. First, participants have to infer the task incentive through feedback (i.e., task incentive is not explicitly given to participants). Second, we know there are individual differences with respect to how much people pay attention to feedback or make inferences based on feedback (Kluger & Denisi, 1996). Those who display the most congruence should perform the best.*

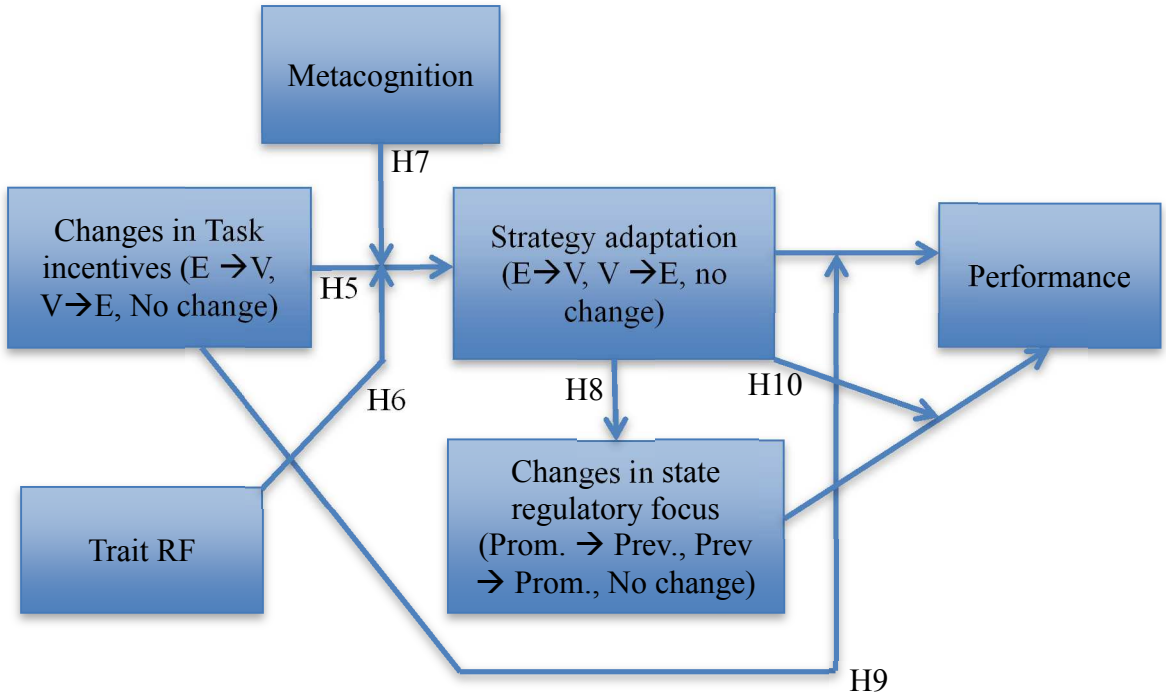

Figure 2. Dynamic model with change variables.

As individuals detect a change in task incentive through metacognition, they will adapt their strategy to the one that is currently most effective. As a result, shifts in task incentive will be accompanied by shifts in strategy that mirror the change in incentive.

H5: Task incentive shifts (i.e., eagerness to vigilance or vigilance to eagerness or no change) will lead to strategy switching in direction of change in task incentive.

H5a[7]*: Over time, a shift in task incentive from vigilance to eagerness will induce strategy switching in the direction from vigilance to eagerness. This shift will be significantly greater than for individuals who do not face a shift in task incentive.*

[7] This hypothesis is not shown in the model because of the difficulty in displaying within subject effects in a model.

H5b: A shift in task incentive from eagerness to vigilance will induce strategy switching in the direction from eagerness to vigilance. This shift will be significantly greater than for individuals who do not face a shift in task incentive.

Promotion and prevention orientation hold divergent characteristics (Scholer & Higgins, 2012). Characteristics of promotion orientation enable strong prevention-oriented people to adapt to new situations. The promotion system is characterized by the desire to make gains—known as achieving new and desired states—even at the expense of lows. To make these gains, promotion-oriented people consider multiple means or alternatives. They also tend to engage in global processing, enabling them to see larger patterns rather than smaller details. All of these characteristics allow promotion-oriented people to adapt to new situations. They have the motivation to adapt, because such changes in behavior could bring about gains. Not only do they have the motivation, but also they have the means to figure out how to adapt to new situations as they explore multiple pathways to success and engage in global processing.

On the other hand, prevention-oriented people are not motivated nor are they as capable of adapting to new circumstances as promotion-oriented people. High prevention is typically associated with a need to maintain the status quote. Because behavioral changes might result in losses, those with strong prevention systems tend to avoid changing behavior. They may not even be able to tell that new behaviors are required, as they typically use local processing and hold high commitment to one course of action rather than exploring other options. The divergent characteristics of promotion and prevention have implications for how individuals respond to changes in task incentive.

H6: Trait regulatory focus will interact with the effect of change in task incentive on change in strategy.

H6a: Trait promotion will exert a positive effect on the degree to which individuals adapt strategies to align with changes in task incentive.

H6b: Trait prevention will exert a negative effect on the degree to which individuals adapt strategies to align with changes in task incentive.

Metacognition involves thinking about past strategy choices and therefore is critical to choosing effective strategies (Zimmerman, 1999). When the task incentive changes, different strategies are required. Monitoring feedback is a part of metacognition and those who engage in feedback monitoring will make strategy choices that are more responsive to changing situational characteristics (e.g., task incentive) than those who fail to monitor feedback as consistent with social-cognitive theory (Zimmerman, 1999). In order to connect past strategies to outcomes, and therefore change one's strategy in response to changing task incentives, one must engage in metacognition.

H7: Metacognition will interact with change in task incentive to influence strategy adaptation. Specifically, greater metacognition will strengthen the positive relationship between changes in task incentive and strategy adaptation whereas less monitoring will weaken it.

Individuals desire regulatory fit and tend to choose regulatory fit over misfit because regulatory fit 'feels right' (Higgins, 2000). However, environmental characteristics (e.g., task incentive) may require individuals to choose strategies that mismatch regulatory focus to remain effective.

However, nothing prevents agents from changing their state regulatory orientation, which is thought to be malleable. Hence individuals will change their state regulatory focus to mirror the strategy. Generally, changes in state regulatory focus will be slower than changes in strategy. This is because strategies are a focus of attention. Attention is extremely malleable, and can

readily fluctuate as the environment changes. State regulatory focus, on the other hand, characterizes the types of goals (either safety concerns or concerns for advancement) that individuals possess and may be slightly more stable. This is consistent with Campion and Lord (1982), who found that individuals first change their strategies and afterwards change their goals in response to negative feedback.

H8: Strategy adaptation will influence changes in state regulatory focus.

H8a: When individuals choose a strategy that misfits their regulatory focus, state regulatory focus will later change to align with the strategy and result in regulatory fit. H8b: The greater that state regulatory focus misaligns with strategy, the more rapid the change in state regulatory focus.

H8c: There will be an indirect effect of changes in task incentives on changes in state regulatory focus through strategy switching.

H8d: Changes in strategies will be more rapid and greater in magnitude than changes in state regulatory focus.

The effectiveness of a given strategy will be determined by the current incentives embedded in the task. Thus, strategy switching that is consistent with changes in the incentives of the task will result in optimal performance.

H9: Changes in task incentive will interact with changes in adaptation to influence performance. Specifically, strategy adaptation (eagerness to vigilance, vigilance to eagerness, or no change) that reflects changes in task incentive (eagerness task incentive to vigilance task incentive, vigilance task incentive to eagerness task incentive, or no change) will lead to greater performance outcomes than when strategy adaptation does not mirror task incentive changes.

As individuals monitor their past strategies and resulting outcomes over time, they will have a more accurate understanding of what strategies produce the greatest performance outcomes (Zimmerman, 1989).

H10: Strategy adaptation will interact with changes in state regulatory focus to influence performance. Specifically, changes in state regulatory focus will have a more positive impact on performance when they are in the same direction as changes in strategy versus when they are in an opposite direction to changes in strategy.

There will be main effects of time on strategy choice. This is because there is a shock in the middle where the task incentive changes. This shock will influence strategy choice.

H11[8]*: Main effect of time on strategy choice.*

H11a: Before a switch in task incentive (i.e., times 1, 2, and 3), strategy choice will change in the direction of the current task incentive over time.

H11b: After a switch in task incentive (i.e., times 4, 5, and 6), strategy choice will change in the direction of the current task incentive over time.

[8] H10 is described in text, not shown in Figure 1, because of the difficulty in displaying time effects in a figure.

METHODS

Participants

Participants were 293 undergraduate students enrolled in psychology courses, ranging from beginning levels to 400 level courses, at a large university. Participants received 3 credits but no financial reward. The majority of participants were White (73.72%) and female (60.41%).

Design

The design was 3 (eagerness to vigilance task incentive, vigilance to eagerness task incentive, neutral) X 2 (metacognition, no metacognition) study with repeated measures. Both independent variables, task incentive and metacognition, were manipulated: The task incentive induction was manipulated within-subjects, whereas the metacognitive manipulation was induced between subjects, resulting in a mixed design and 6 conditions. This design was used to test the between and within subject effects of metacognition and task incentive on strategy adaptation, regulatory focus adaptation and performance.

Procedure

Before participants entered the laboratory, the experimenter divided participants into the 6 conditions based on a program of randomization. Upon entering the laboratory and completing informed consent, participants went through a brief training program and worked on 1 practice trial. The purpose of the practice trial was to minimize the possibility that learning effects over time provided alternative explanations for within-person results and to measure specific TANDEM ability. Next, participants performed the first iteration of the task, and received feedback, which contained the task incentive manipulation. Afterwards, participants completed a measure of state regulatory focus and metacognitive activity. They then repeated this process for the 2nd and 3rd iteration of the task. After feedback following the 3rd trial, the task incentive

shifted. Participants then completed the remaining 6 trials. After the 9th trail, participants were debriefed. Throughout the experiment, all instructions and manipulations were computerized. The only part of the study requiring the experimenter to speak was the practice sessions and training towards the beginning.

Task

Participants completed a task called TANDEM. TANDEM is a radar-tracking simulation that required participants to hook targets and collect information about these targets. They used this information in making final decisions to shoot or not shoot targets.

The final shoot or not shoot decision is in part what makes TANDEM appropriate for testing signal detection theory—a framework that is based on binary decisions (Wickens, 1982). In Table 1, I describe the four outcomes of signal detection theory based on the shoot or no shoot decision in TANDEM and the accuracy of that decision.

Table 1: *TANDEM: Shoot and No Shoot Decisions, Outcomes, Strategies, and Points*

Decision in TANDEM	Accuracy of Decision	Outcome	Strategy	Point increase/decrease
Shoot	Correct	Hit	Eagerness	+2 points
Shoot	Incorrect	False alarm (i.e., error of commission)	Eagerness	-2 points
Not Shoot	Correct	Correct rejection	Vigilance	+1 point
Not Shoot	Incorrect	Error of omission	Vigilance	-1 point

Decisions to shoot may result in either hits or false alarms and multiple shoot decisions tend to indicate an eagerness strategy. Decisions to *not* shoot may result in either correct rejections or errors of omission and multiple *not* shoot decisions tend to indicate a vigilance strategy.

To explain the score changes in the right-most column, I must first refer to an important prerequisite for adequately testing signal detection theory. That is—valid tests of signal detection theory capture a binary decision to either engage in action or inaction, because the decision to engage in action or inaction is what helps differentiate the four outcomes—hits, correct rejections, false alarms, and errors of commission. For example, hits and correct rejections are differentiated in signal detection theory by the notion that hits involve the decision to engage in some sort of action, whereas correct rejections involve the decision to avoid engaging in action. Similarly, false alarms and errors of omission are distinguished by the fact that false alarms involve action, whereas errors of omission involve inaction.

The increases or decreases in points that one may receive in TANDEM reflect the action versus inaction distinction. When framing the task, all participants were told that decisions to shoot are choices to engage in action, whereas decisions to not shoot are choices to refrain from acting. This framing was consistent with the feedback, indicating that shoot decisions involve more risk than not shoot decisions. When participants made decisions to shoot—a choice to engage in action—they had a chance to increase one's score by 2 points, but also risked a 2-point reduction. However, decisions to *not* shoot—a choice to refrain from acting—allowed for only a 1-point increase or decrease. In this way, shoot decisions reflected action as they are potentially more costly but also potentially more rewarding than decisions to refrain from shooting. Similar point allocations have been used to help distinguish the four outcomes in tests of signal detection theory (Wickens, 2002). In sum, the differential point allocation for shooting and not shooting reinforces the notion that choices to shoot are decisions to act and choices to *not* shoot are decisions to refrain from acting. In turn, this serves to help differentiate the four outcomes in signal detection theory.

Beyond its usefulness in testing signal detection theory, TANDEM is appropriate for this study for several reasons. First, learning effects over time are minimal after a certain level of training and practice with TANDEM. To minimize learning effects and ensure that the task is not too difficult, participants only needed to remember one piece of information for each of the four decisions. Second, amendments to TANDEM allowed me to ensure that the task did not unintentionally induce a prevention or promotion state orientation. Perimeters were excluded from this task so as to avoid inducing prevention orientation. Targets moved from right to left, instead of coming directly at the player, so as to avoid inducing prevention orientation. Lastly, the framing of the task was neutral. There was no mention of gains or losses. For example, instructions did *not* contain information requiring participants to take over another territory or defend their own.

Manipulations

Task incentive was intended to incentivize eagerness strategies, vigilance strategies, or neutral. As shown in Table 2, in the eagerness condition, the vast majority of the targets were hostile. Thus, decisions to shoot were incentivized. In the vigilance condition, the vast majority of targets were peaceful. Thus, decisions to not shoot were incentivized. Importantly half of the targets were ambiguous across all conditions. This meant the intent of these targets were "unknown". This ambiguity was necessary for testing signal detection theory (Wickens, 1982). Manipulating task incentive by influencing whether a yes decision (e.g., shoot) or no decision (e.g., do not shoot) is most effective has been used in many successful manipulations of task structure in signal detection theory (Wickens, 2002).

Table 2: *Description of Task Incentive Manipulation*

	Hostile targets	Peaceful targets	Total Ambiguous targets	Total targets
Eagerness	18 hostile (9 ambiguous)	2 peaceful (1 ambiguous)	10	20
Vigilance	2 hostile (1 ambiguous)	18 peaceful (9 ambiguous)	10	20
Neutral	10 hostile (5 ambiguous)	10 peaceful (5 ambiguous)	10	20

Table 3 outlines the logic for why the task incentive manipulation influenced strategy choice. Table 4 provides the rationale for why task incentive shifts would ultimately result in changes to state regulatory focus.

Table 3: *Rationale for Why Task Incentive Manipulation Prompted Change in Strategy*

	Rationale
I.	Signal detection theory is most relevant in ambiguous situations. Thus, to examine the strategy to focus on hits and false alarms versus correct rejections and errors of omission, at least half of the targets were ambiguous. This means that participants were unsure whether the correct decision was to shoot or not shoot, as the intent was "unknown". The exact number of ambiguous targets was tested in pilot 1.
II.	Even for ambiguous targets, it is likely that participants, particularly those engaging in metacognition, were able to figure out whether an ambiguous target was hostile or peaceful. a. Those participants who engaged in metacognition likely were able to pick up on the notion that most targets were peaceful or most targets were hostile in a single task episode from the feedback. The feedback indicated how many targets should have been shot or not shot, as well as how many targets the participant actually decided to shoot or not shoot. The metacognitive manipulation was designed to enhance the salience of this feedback, as participants were required to write the feedback down (e.g., total number of targets that should have been shot, total number of targets that should not have been shot, how many targets they actually shot, how many targets they did not shoot). Afterwards, participants were asked about the feedback in probe questions. b. Also, participants did not have to wait until after the task episode to pick up on the fact that most of the targets in a single task episode were either mostly peaceful or mostly hostile, as they received feedback about the correctness of each decision while they played the task. This feature of TANDEM was emphasized to ensure they know how to receive immediate feedback about decisions while they played the game. c. The class and altitude decisions were always fixed for ambiguous targets. Specifically, ambiguous targets had class military and surface vessels. This served to prevent participants from trying to infer the intent decision of ambiguous targets based on other decisions such as class and altitude. This might have hampered them from discovering what the intent decision actually was for ambiguous targets. In training, participants were told that class and altitude decisions were always the same for ambiguous targets.
III.	Participants were likely able to figure out that either peaceful targets or hostile targets predominate a single task (i.e., they will pick up on task incentive). Thus, participants likely applied information about the current task incentive when deciding to shoot or not shoot ambiguous targets. Thus, an eagerness incentive in which hostile targets predominated likely led participants to have a strategy to shoot targets. Conversely, a vigilance incentive in which peaceful targets predominated likely led participants to have a strategy to focus on not shooting targets. As the task incentive shifted, so too did they shift their strategy.

Table 4: *Rationale for Why Task Incentive Likely Led to a Change in State Regulatory Focus*

Rationale
I. In the past, TANDEM has resulted in at least a minimal level of interest and engagement from most participants. II. In TANDEM, participants likely had some sense that shoot decisions were more risky, but also potentially more rewarding than not shoot decisions. A. During training, participants were told that decisions to shoot are choices to engage in action, whereas decisions to not shoot were choices to refrain from acting. These instructions were repeated in the manual after every performance trial. Participants received either +2 or -2 points for shooting, but only +1 or -1 points for not shooting. This point allocation reinforced the perception that shooting is somewhat more risky than not shooting. III. Promotion-oriented people are characterized by the desire to make gains. State prevention-oriented people are characterized by wanting to avoid losses and maintaining the status quo. IV. Changes in strategy over time tend to orient people towards wanting to avoid losses and maintaining the status quo or having the desire to make gains. In the eagerness condition, participants were incentivized to make risky decisions (e.g., shoot decisions). As participants continued to be rewarded for making risky decisions and punished for making conservative decisions in the eagerness condition, a stronger promotion focus likely emerged. This likely resulted in a desire to make gains and be more ambitious. Because participants likely cared about their performance in TANDEM, they likely perceived a cost associated with losing points due to making conservative decisions in the eagerness condition. In the vigilance condition, participants were incentivized to make conservative decisions (e.g., not shoot decisions). They were punished for making risky decisions (e.g., shoot decisions). As participants were rewarded for conservative decisions and punished for risky decisions in the vigilance condition, a stronger prevention focus likely emerged. As a result, participants probably started to feel a desire to maintain the status quo and avoid losses. V. Mounting evidence suggests that people prefer fit, because fit "feels right" (Higgins, 2000). Therefore, one would expect changes in strategy (in response to task incentive shifts) to coincide roughly with changes in state regulatory focus.

Although the above logic is sound, I conducted a pilot study in order to verify the effects of task incentive on eagerness versus vigilance strategies (see Appendix A for a full description of the method, predictions, and findings of Pilot 1). I used a 2 (Task incentive: eagerness to vigilance, vigilance to eagerness) X 2 (metacognition versus no metacognition) design with nine time points and evaluated predictions using repeated measures ANOVA's. As expected, the task incentive manipulation predicted eagerness strategy in expected ways. Specifically, those individuals who received an eagerness task incentive at time 4 exhibited a greater eagerness bias

(averaging across time points 5-9) than individuals who received a vigilance task incentive at time 4.

The *metacognition* manipulation used in this experiment is adapted from Kozlowski, Deshon et al. (2007). They used open-ended probe questions to prime metacognitive processing. The probes captured (1) monitoring performance feedback and (2) evaluating quality of strategy. Some examples of the probes include: Did you improve your score this round? (Yes, no). Why or why not? If you improved your score, how did you do it? If your score decreased, why? What is hurting your score the most? How can you overcome that? What strategy do you plan to use to increase your score next round? Are you going to do anything differently next time? The present manipulation was consistent with the construct of metacognition, which includes planning, evaluating, monitoring, and revising goal-directed behavior (Smith, 1996). Because monitoring feedback is an important part of metacognition, participants recorded their feedback. Specifically, they recorded how many targets were hostile and how many were peaceful, how many targets they shot and how many they did not shoot, and the total number of points they received. This recording of feedback happened before the probe questions.

Measures

Signal detection theory was used to operationalize *strategy choice*. More hits and false alarms on ambiguous targets resulted in greater eagerness strategy. The more correct rejections and errors of omission on ambiguous targets that participants hold, the greater the vigilance strategy they had. Strategy choice was a single variable; higher scores indicated eagerness, lower scores indicated vigilance.

It was reasonable to use signal detection theory to operationalize strategy choice for two main reasons. First, strategy choice in regulatory focus theory is typically measured using signal

detection theory—by the objective number of errors of omission, errors of commission, correct rejections, and hits (e.g., Crowe & Higgins, 1997). Second, signal detection theory has been tested across many areas of study and shown to be a useful framework for understanding binary decisions such as strategy choice (Wickens, 2002).

Consistent with the distinction between strategies and tactics as mentioned earlier, strategies was operationalized as the aggregate strategy towards hits and false alarms versus correct rejections and errors of commission on ambiguous targets in a single trial (Scholer & Higgins, 2008). This operationalization was in contrast to tactics, which can be thought of at the behavioral level and operationalized as a single decision (Scholer & Higgins, 2008).

As far as the state regulatory focus scale, I conducted a pilot in order to create and confirm the reliability of a concise measure of state regulatory focus with a 2-factor structure (a full description of pilot 2 is shown in Appendix B). Using a confirmatory factor analysis, I found that the 2-factor structure exhibits good fit. The final measure containing 10 items is shown in Appendix C.

The operationalization of strategy and state regulatory focus was distinct. An eagerness strategy was indicated by decisions to engage in actions such as shooting; vigilance strategy was indicated by decisions to avoid action such as not shooting, consistent with the carefulness associated with vigilance strategies. This operationalization is distinct from state regulatory focus in that it does not capture the reasons why these individuals are pursuing these strategies. Higher-level promotion goals such as advancement and nurturance and prevention goals such as safety, responsibility, and obligations are embedded in the state regulatory focus measure, yet absent from the operationalization of strategy. Importantly, eagerness strategies served prevention goals

and vigilance strategies served promotion goals, as I argue in the section on fit versus misfit. This points to the distinctiveness of state regulatory focus and strategies.

Dispositional regulatory focus taps into the tendency to be promotion-oriented and prevention-oriented as shown in Appendix D (Lockwood, Jordan, & Kunda, 2002).
Ability was operationalized as the highest score achieved in the ACT or SAT. This was self-reported by participants. These tests were commonly used to measure intelligence as they have a large cognitive ability component. These self-reported scores correlate highly with actual scores, between .88 and .92, and thus should suffice (Cassady, 2001). *Specific ability*, another control variable, is operationalized as average performance on all practice trials.

Performance was measured based on participant behavior. The number of correct decisions minus the number of errors was the indicator of performance. Task incentive and performance standards were distinguishable as task incentives are intended to incentivize a strategy to focus on shooting or not shooting. Performance does not capture this strategy. Rather, performance was the number of correct decisions minus incorrect decisions. Thus, performance was distinct from the strategy to focus on shooting or not shooting, because correct decisions could involve shooting or not shooting and incorrect decisions can involve shooting or not shooting.

I used an adapted measure of *metacognitive activity* by Firth (2010) and Kozlowski et al. (2006) (see Appendix E for items). Items were a 5-point scale from 1 (never) to 5 (constantly). From Firth's (2010) dissertation, one can see some convergent and discriminant validity for the measure. It seems to correlate positively with constructs like learning goal orientation and self-efficacy that theoretical should correlate positively with metacognition. The metacognition measure does not correlate with constructs such as ability that theoretical should be unrelated to

metacognition. *Dispositional metacognition* was assessed using a commonly used measure by Schraw and Dennison (1994) as shown in Appendix F. This measure captured the metacognitive dimensions of declarative knowledge, procedural knowledge, conditional knowledge, monitoring, and evaluation.

Although monitoring feedback was not included in the model, I used this variable to diagnose the effects of the task incentive manipulation. An objective indicator of this construct was included in TANDEM.

Analysis

To test the static model, I ran regression in MPLUS. To evaluate the more complex and dynamic model, I used a discontinuous latent growth model (Singer & Willet, 2003). A *discontinuous* latent growth model was necessary, because of the shock or change that happened in the middle of the experiment (i.e., the change in task incentive). In the tables below, I describe the analytic plan. Table 5 is comprised of the static hypotheses that involve between-person effects. Table 6 contains hypotheses from the dynamic model that involve within-person relationships. These tables include the hypotheses (in the left-most column), the analytic method (in the middle column), and the analytic steps used to test each hypothesis (in the right-most column).

Table 5: *Analytic Plan for Testing Hypotheses from the Static Model*

Hypothesis	Method	High-level overview of analytic steps*
1: *Main effect of trait regulatory focus: Trait promotion focus will have a positive association with eagerness strategy; trait prevention focus will positively relate to vigilance.*	Linear Regression	1. Regress eagerness strategy at time 2 onto trait promotion focus and trait prevention focus.
2a: *Task incentive will exert a positive and main effect on strategy choice, such that eagerness task incentives will lead to eagerness strategies and vigilance task incentives will lead to more use of vigilance strategies.*	Linear Regression	1. Regress eagerness strategy at time 2 onto task incentive manipulation variable, which contains eagerness task incentive, vigilance task incentive, and neutral task incentive.
2b: *Task incentive will account for more variance in strategy choice than dispositional regulatory focus.*	Relative importance analysis	1. Create composite measure of eagerness score from time points 4-9. 2. Use online procedure by Scott Tonidandel to do relative importance analysis, which is shown here: http://relativeimportance.davidson.edu/multipleregression.html
3a: *Metacognition and trait regulatory focus will interact to influence strategy choice. Specifically, the influence of trait regulatory focus on strategy choice will be greater when metacognition is low than when it is high.*	Linear Regression	1. Model, using regression, the effect of metacognition, trait promotion focus, trait prevention focus, the interaction term between metacognition and trait prevention focus, and the interaction term between metacognition and trait promotion focus on eagerness at time 2.
3b: *Although not incorporated into the model, we expect that greater metacognition will result in a greater likelihood that strategies will misfit with dispositional regulatory focus.*	Linear Regression	1. Create misfit variable by first, converting the trait promotion, trait prevention, and eagerness at time 2 variables to z scores so as to make the variability of the two measures equivalent. 2. Using these z scores and distance formulas, compute the two misfit variables: between trait promotion and eagerness at time 2 and between trait prevention and eagerness at time 2. 3. Regress misfit variable between trait promotion and eagerness onto metacognition condition. 4. Regress misfit variable between trait prevention and eagerness onto metacognition condition.
4: *Task incentive will interact with eagerness at time 2 to influence performance at time 2: Greater performance results when eagerness choice is aligned with task incentive than when it is misaligned.*	Linear Regression	1. Regress performance at time 2 onto the interaction term between task incentive and eagerness at time 2.

* The right-most column provides a high-level overview of the analytic steps necessary to test each hypothesis. Please see the results section for more explanation and justification for these analytic steps.

Table 6: *Analytic Plan for Testing Hypotheses from the Dynamic Model*

Hypothesis	Method	*High-level overview of analytic steps
5a: *Task incentive shifts from eagerness to vigilance will induce greater eagerness switching than those who do not receive a change in task incentive.*	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before discontinuity (time points 1-3) and after the discontinuity (time points 4-9). 2. Model effect of shift from eagerness to vigilance (compared to neutral) in task incentive on slope of eagerness after the discontinuity (time points 4-9).
5b: T*ask incentive shifts from vigilance to eagerness will induce greater eagerness switching than those who do not receive a change in task incentive.*	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before the discontinuity (time points 1-3) and after the discontinuity (time points 4-9). 2. Model effect of shift from vigilance to eagerness (compared to neutral) in task incentive on slope of eagerness after discontinuity (time points 4-9).
6: *Trait promotion will exert a positive effect (and trait prevention will exert a negative effect) on the degree to which individuals adapt strategies to align with changes in task incentive*.	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before the discontinuity (time points 1-3) and after discontinuity (time points 4-9).

Table 6 (cont'd)

		2. Simultaneously model effect of interaction between trait promotion and task incentive and between trait prevention and task incentive on slope of eagerness after discontinuity (time points 4-9).
7: *Metacognition will interact with change in task incentive to influence eagerness adaptation. Specifically, greater metacognition will strengthen the positive relationship between changes in task incentive and eagerness adaptation whereas less monitoring will weaken it.*	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before and after the discontinuity. 2. Create interaction term between task incentive and metacognition. 3. Model effect of interaction between task incentive and metacognition on slope of eagerness after discontinuity (time points 4-9).
8a: *when individuals initially choose an eagerness strategy that misfit their regulatory focus, state regulatory focus will later change to align with the strategy and result in regulatory fit.*	Discontinuous latent growth curves	1. Use distance formula to compute misfit between *state promotion focus* and eagerness both before and after the discontinuity 2. Use distance formula to compute misfit between *state prevention focus* and eagerness both before and after the discontinuity.

Table 6 (cont'd)

		3. Include only individuals who experienced above average misfit between eagerness and state promotion by computing the mean and removing individuals below that mean. Then, regress this misfit after the discontinuity onto this misfit before the discontinuity. 4. Include only individuals who experienced above average misfit between eagerness and state prevention focus by computing the mean and removing individuals below that mean. Then, regress this misfit after the discontinuity onto this misfit before the discontinuity.
8b: *the greater that state regulatory focus misaligns with strategy, the more rapid the change in state regulatory focus.*	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before and after the discontinuity. 2. Use the misfit variables (the ones created above in testing hypothesis 8a). 3. Regress first slope of state promotion onto the first slope of misfit between state promotion and eagerness. 4. Regress first slope of state prevention onto the first slope of misfit between state promotion and eagerness.

Table 6 (cont'd)

		5. Regress second slope of state promotion onto the first slope of misfit between state promotion and eagerness. 6. Regress second slope of state prevention onto the first slope of misfit between state prevention and eagerness.
8c: *There will be an indirect effect of changes in task incentives on changes in regulatory focus through eagerness switching.*	Discontinuous latent growth curves	1. Discontinuous latent growth curves to model the slope of eagerness before the discontinuity and the slope of eagerness after the discontinuity. 2. Model effects of independent variable on mediator and effect of mediator on outcome. This involves modeling effect of task incentive on slope of eagerness after the discontinuity and modeling the effects of slope of eagerness after the discontinuity on slope of state promotion and slope of state prevention after the discontinuity. 3. If warranted, test mediation using code by Preacher.

Table 6 (cont'd)

8d: *Changes in strategies will be more rapid and greater in magnitude than changes in state promotion or state prevention.*	Linear hypothesis testing (using chi-square difference tests)	1. Use linear hypothesis testing to compare two nested models: (1) one in which variance over time of state promotion focus and eagerness were equal and (2) another in which variance of eagerness over time was greater than the variance of state promotion. 2. Use linear hypothesis testing to compare two nested models: (1) one in which variance over time of state prevention focus and eagerness were equal and (2) another in which variance of eagerness over time was greater than the variance of state prevention.
9: *Changes in task incentive will interact with the second slope of eagerness to influence the second slope of performance. Specifically, slope of eagerness that reflects changes in task incentive (E→V, V→E, or no change) will lead to greater performance outcomes than when strategy adaptation does not mirror task incentive changes.*	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before and after the discontinuity. 2. Model the main and interactive effects of task incentive and slope of eagerness after discontinuity (time points 4-9) on slope of performance after discontinuity (time points 4-9).

Table 6 (cont'd)

10a: *strategy adaptation will interact with second slope of state promotion focus to influence the second slope of performance. Specifically, changes in state promotion focus will have a more positive impact on performance when they are in the same direction as changes in strategy versus when they are in an opposite direction to changes in strategy*.	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before and after the discontinuity. 2. Model the main and interactive effects of slope of eagerness after discontinuity (time points 4-9) and slope of state promotion after discontinuity (time points 4-9) on slope of performance after discontinuity (time points 4-9).
10b: *strategy adaptation will interact with second slope of state prevention focus to influence the second slope of performance. Specifically, changes in state prevention focus will have a more positive impact on performance when they are in the same direction as changes in strategy versus when they are in an opposite direction to changes in strategy*.	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before and after the discontinuity. 2. Model main and interactive effects of slope of eagerness after discontinuity (time points 4-9) and slope of state prevention after discontinuity (time points 4-9) on slope of performance after discontinuity (time points 4-9).
11: Expected that changes in task incentive would positively predict the slope of eagerness curve 1 (Hypothesis 11a) and slope of eagerness curve two (Hypothesis 11b).	Discontinuous latent growth curves	1. Discontinuous growth curves to model the 2 intercepts and 2 slopes of eagerness before and after the discontinuity.

Table 6 (cont'd)

	2. Model effect of task incentive on the slope of eagerness before the discontinuity (time points 1-3) and slope of eagerness after discontinuity (time points 4-9)

* The right-most column provides a high-level overview of the analytic steps necessary to test each hypothesis. Please see the results section for more explanation and justification for these analytic steps.

RESULTS

In this section, I describe results of the main data collection to evaluate hypotheses one through eleven. First, I discuss my protocol for data cleaning. Second, I present descriptive statistics. Third, I touch on results of the manipulation check. Fourth, I present findings for the hypotheses within the static model. Fifth, I display findings for the hypotheses within the dynamic model.

Data Cleaning Protocol

To create a data cleaning procedure, I modified the suggested steps from the data preparation procedure documented by Smith, Budzeika, Edwards, Johnson, and Bearse (1986). I used the following 10-step process: (1) Save raw data, (2) Start a journal that documents the process of cleaning data, (3) Dump data from SQL and merge multiple datasets from multiple sources (4) Create variables (5) Run descriptive statistics to understand data and detect any out of range values or errors, (6) Deal with missing data, (7) Recode reversed scored items, (8) Form scale scores and composites, (9) Keep raw data and documentation, (10) Read data into MPLUS and verify that means and standard deviations in MPLUS match those in SPSS. Below I provide more detail for certain steps of the cleaning procedure.

In step (3), I took multiple separate datasets from SQL and from hpr and integrated them into one dataset. These separate datasets included: (1) Performance on performance trials and practice trials from SQL, (2) Process measures (e.g., state regulatory focus) from SQL, and (3) Trait measures (e.g., trait regulatory focus) from HPR. In SQL, there is a separate file for performance information about each trial. Two research assistants saved these files one by one and then the experimenter integrated these datasets using a macro in excel. I then integrated all of these separate datasets by using the PID. I then discarded PID and used the subject number in

the rest of the analyses so that the data could not be linked back to the individual. Next, I took random samples of the newly created spreadsheet and matched them against the values of the original datasets. I observed no discrepancies, indicating that no data was lost in the merging of the datasets from different sources.

In step (4), I created the eagerness and performance variables. I created strategy by taking the total number of "shoot" decisions and dividing that number by the total number of targets that were prosecuted. I created performance by taking the total number of correct decisions and subtracting this number from the total number of mistakes. In step (5), I ran descriptive statistics to understand data and detect any out of range values or errors. Any out of range values were marked as missing; however, very few were present because the survey items do not allow them.

In step (6), I dealt with missing data. I had 12 items across the online and laboratory surveys that were used to detect careless responding. I eliminated participants from analysis that failed 3 or more of the 12 (25%) careless responding items. 22 out of the 315 participants (7.0%) provided incorrect answers to at least 3 out of the 12 careless responding items. To ensure the missing data due to careless responding was random, I ran a two-way ANOVA with the manipulations as independent variables and the total number of correct responses on careless responding items as dependent variables. None of the main effects, 2-way interactions, or 3-way interactions between the two independent variables had significant effects on the number of correct responses to careless responding items. This provides support that missing due to careless responding was random.

In step (7), I recoded reversed scored items. To ensure that the appropriate items were reverse scored, I looked at all inter-item correlations and fortunately, I did not find any zero or negative inter-item correlations.

Descriptive Statistics

In Table 7 (below), I provide descriptive statistics including N, minimum, maximum, means, and standard deviations. In Table 8 (below), I report bivariate correlations and include 2 variables for each time-varying covariate: the first value is a composite score including all time points before the discontinuity (i.e., time points 1-3) and the second value is a composite score including all time points after the discontinuity (i.e., time points 4-9). Appendix G captures means and standard deviations for variables at each of the nine time points; Appendix H captures bivariate correlations for variables at each of the nine time points. Alphas are shown on the diagonals; they are greater than the .7 rule discussed in Nunnally and Bernstein (1994).

Table 7: *N, Minimum, Maximum, Means, and Standard Deviations*

	N	Minimum	Maximum	Mean	Std. Deviation
EV	293	0	1	0.31	0.47
VE	293	0	1	0.36	0.48
NeutC	293	0	1	0.32	0.47
MetaC	293	0	1	0.50	0.50
Pract	293	-2.00	8.00	1.55	1.95
Gender	291	1	2	1.39	0.49
Race	289	1	5	1.48	0.98
ACTSAT	280	700.00	1600.00	1146.21	139.70
GPA	289	1.00	4.00	3.09	0.57
DProm	293	2.57	9.00	7.41	1.09
DPrev	293	1.78	9.00	6.01	1.36
DMeta	293	2.29	6.86	5.30	0.69
Eag1To3	281	.00	1.00	0.48	0.28
Eag4to9	281	.00	1.00	0.50	0.29
Spm1to3	293	1.00	11.00	6.68	1.72
Spm4to9	293	1.00	10.93	6.39	1.97
Spv1to3	293	1.00	10.27	6.73	1.64
Spv4to9	293	1.00	10.43	6.37	1.95
Meta1to3	293	1.00	4.67	3.48	0.64
Meta4to9	293	1.00	4.71	3.26	0.81
Perf1to3	293	-1.67	12.67	4.86	2.56
Perf4to9	293	-6.17	12.50	6.24	2.94

EV = Eagerness to vigilance condition; VE = Vigilance to eagerness condition; NeutC = Neutral; MetaC = Metacognitive condition; Pract = Score on the practice trial; ACTSAT = SAT/ACT score; GPA = Undergraduate GPA; DProm = Trait promotion; DPrev = Trait prevention; DMeta = trait metacognition; Eag1To3 = Eagerness curve 1; Eag4to9 = Eagerness curve 2; Spm1to3 = state promotion curve 1; Spm4to9 = state promotion curve 2; Spv1to3 = state prevention curve 2; Spv4to9 = state prevention curve 2; Meta1to3 = state metacognition curve 1; Meta4to9 = state metacognition curve 2; Perf1to3 = performance curve 1; Perf4to9 = performance curve 2.

Table 8: *Bivariate Correlations, Means, and Standard Deviations, and Alpha's*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. EV												
2. VE	-.51**											
3. NeutC	-.47**	-.52**										
4. MetaC	-0.03	-0.03	0.06									
5. Pract	0.03	-0.01	-0.02	-0.01								
6. Gender	-0.04	.13*	-0.09	-0.07	-0.02							
7. Race	-0.04	0.04	-0.01	-.14*	-.16**	0.07						
8. ACTSAT	0.02	-0.02	0.00	0.01	.24**	.20**	-.25**					
9. GPA	-0.07	0.01	0.06	0.03	.20**	-0.06	-.18**	.33**				
10. DProm	-0.08	0.05	0.03	-0.01	.12*	-0.11	.13*	-.13*	0.11	-0.81		
11. DPrev	-0.10	0.03	0.07	0.00	0.01	-0.09	-0.03	-0.07	-.18**	.15*	-0.79	
12. DMeta	-0.03	-0.06	0.09	0.06	.22**	-0.07	0.04	-0.08	.12*	.44**	-0.03	-0.91

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

EV = Eagerness to vigilance condition; VE = Vigilance to eagerness condition; NeutC = Neutral condition; MetaC = Metacognitive condition; Pract = Score on the practice trial; ACTSAT = SAT/ACT score; GPA = Undergraduate GPA; DProm = Trait promotion; DPrev = Trait prevention; DMeta = trait metacognition.

Table 8 (cont'd)

	13. Eag1to3	14. Eag4to9	15. Spm1to3	16. Spm4to9	17. Spv1to3	18. Spv4to9	19. Meta1to3	20. Meta4to9	21. Perf1to3	22. Perf4to9
1. EV	.46**	-.37**	0.08	-0.03	0.08	0.03	0.00	0.05	.20**	.14*
2. VE	-.32**	.50**	-0.07	0.07	-0.08	-0.02	-.14*	-.13*	0.08	.27**
3. NeutC	-.13*	-.14*	-0.01	-0.04	0.01	0.00	.14*	0.09	-.27**	-.42**
4. MetaC	-0.11	-0.01	0.01	.14*	-0.08	0.08	0.00	.17**	0.07	.24**
5. Pract	-0.01	-0.08	0.02	-0.05	0.07	0.03	-0.05	-0.02	.53**	.23**
6. Gender	0.10	0.09	0.00	0.06	-0.08	0.00	-.13*	-0.06	-0.07	-0.02
7. Race	0.04	-0.01	-0.01	0.09	0.04	0.06	0.05	0.01	-.25**	-.16**
8. ACTSAT	0.08	-0.03	0.04	0.00	-0.02	-0.06	-0.11	-0.07	.20**	.13*
9. GPA	-0.04	-0.12	0.02	0.00	-0.05	-0.06	0.07	0.03	.17**	0.11
10. DProm	-0.06	-0.08	.21**	.18**	.19**	.13*	.26**	.14*	-0.02	-0.06
11. DPrev	0.04	0.05	0.11	0.04	.31**	.21**	0.11	-0.04	-0.07	-0.07
12. DMeta	-0.03	-0.05	.26**	0.11	.15*	0.10	.22**	0.11	0.07	0.02

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

EV = Eagerness to vigilance condition; VE = Vigilance to eagerness condition; NeutC = Neutral condition; MetaC = Metacognitive condition; Pract = Score on the practice trial; ACTSAT = SAT/ACT score; GPA = Undergraduate GPA; DProm = Trait promotion; DPrev = Trait prevention; DMeta = trait metacognition; Eag1To3 = Eagerness score averaged across time points 1-3; Eag4to9 = Eagerness score averaged across time points 4-9; spm1to3 = state promotion score averaged across time points 1-3; spm4to9 = state promotion score averaged across time points 4-9; spv1to3 = state prevention score averaged across time points 1-3; spv4to9 = state prevention score averaged across time points 4-9; Meta1to3 = state metacognition score averaged across time points 1-3; Meta4to9 = state metacognition score averaged across time points 4-9; Perf1to3 = performance score averaged across time points 1-3; Perf4to9 = performance score averaged across time points 4-9.

Table 8 (cont'd)

	13	14	15	16	17	18	19	20	21	22
13. Eag1To3										
14. Eag4to9	-.10									
15. Spm1to3	.03	-.01	(.93)							
16. Spm4to9	-.02	.04	.72**	(.97)						
17. Spv1to3	.05	-.01	.71**	.53**	(.90)					
18. Spv4to9	-.06	-.01	.61**	.74**	.74**	(.97)				
19. Meta1to3	-.07	-.11	.53**	.39**	.44**	.29**	(.87)			
20. Meta4to9	-.03	-.08	.34**	.55**	.28**	.43**	.58**	(.96)		
21. Perf1to3	-.11	.05	.06	-.12*	.02	-.08	-.04	-.07		
22. Perf4to9	-.01	.19**	.11	.20**	.07	.13*	.02	.19**	.40**	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Eag1To3 = Eagerness score averaged across time points 1-3; Eag4to9 = Eagerness score averaged across time points 4-9; spm1to3 = state promotion score averaged across time points 1-3; spm4to9 = state promotion score averaged across time points 4-9; spv1to3 = state prevention score averaged across time points 1-3; spv4to9 = state prevention score averaged across time points 4-9; Meta1to3 = state metacognition score averaged across time points 1-3; Meta4to9 = state metacognition score averaged across time points 4-9; Perf1to3 = performance score averaged across time points 1-3; Perf4to9 = performance score averaged across time points 4-9.

Manipulation Check

I evaluated the manipulation check by using linear regression. As expected, metacognition positively predicted the metacognitive manipulation check at the first time point following the manipulation (β = 3.33, S.E. = .26, p < .001) and also predicted a composite variable that combined scores of the manipulation check across all nine time points (β = 3.35, S.E. = .25, p < .001).

Static Model Containing Hypotheses 1-4

Below I provide support for the various analytic decisions that I made to evaluate hypotheses in the static model. Afterwards, I describe the support or lack of support for each of the four static hypotheses.

Support for analytic decisions. To evaluate hypotheses 1 through 4 in the static model, I mainly used regression in MPLUS. In Table 9 I provide the unstandardized beta coefficients, standard errors, and p values for hypotheses 1-4. Importantly, the hypotheses in the static model were tested separately because they involved different outcomes and sometimes different analytic techniques. The right-most column in Table 9 signals which tests of the hypotheses are contained within each model. For example, both the effect of trait promotion on eagerness at time 2 and the effect of trait prevention on eagerness at time 2 are labeled model 1. This means that both of these effects are tested within model 1. Importantly, when testing interactions, both main effects are always included in the same model as the interaction.

Table 9: *Static Model Hypotheses*

Hypothesis	Predictor	Outcome	Analysis	*β***	S.E.	p value	R-Square	Models***
1a	Dprom	Eagerness Time 2	Linear Regression	-0.07	0.07	0.29	0.01	Model 1
1b	Dprev	Eagerness Time 2	Linear Regression	0.08	0.16	0.64		Model 1
2a	ETI	Eagerness Time 2	Linear Regression	0.35	0.05	< .001	0.30	Model 2
2a	VTI	Eagerness Time 2	Linear Regression	-0.13	0.05	0.00		Model 2
3a	MetaC*Dprev	Eagerness Time 2	Linear Regression	-0.02	0.03	0.54	0.01	Model 3
3a	MetaC*Dprom	Eagerness Time 2	Linear Regression	0.02	0.04	0.61		Model 3
3b	MetaC	Trait prevention misfit[9]	Linear Regression	0.03	0.13	0.85	0.00	Model 4
3b	MetaC	Trait promotion misfit[10]	Linear Regression	-0.08	0.13	0.53	0.00	Model 5
4a	ETI*Eagerness	Perf2	Linear Regression	0.68	0.06	< .001	0.46	Model 6
4b	VTI*Eagerness	Perf2	Linear Regression	-0.13	0.06	0.02		Model 6
4 (no neutral)	EV*Eagerness	Perf2	Linear Regression	.88	.06	< .001	.64	Model 7

[9] Higher scores indicate greater *fit* between eagerness and prevention.

[10] Higher scores indicate greater *misfit* between eagerness and promotion.

Table 9 (cont'd)

***This column describes what hypotheses are tested in each model. For example, both the effect of trait promotion on eagerness at time 2 and the effect of trait prevention on eagerness at time 2 are labeled model 1. This means that both of these effects are tested within model 1. Importantly, when testing interactions, both main effects are always included in the same model as the interaction.
**Indicates beta coefficients that are unstandardized. ETI = Eagerness task incentive condition as compared to neutral condition; VTI = Vigilance task incentive condition as compared to neutral condition; MetaC = Metacognitive condition; EV = Eagerness condition as compared to vigilance condition; Dprev = Trait prevention focus; Dprom = Trait promotion focus; Perf2 = Performance at time 2.

I made decisions about what time points and control variables to use and employed these decisions across all analyses of the static model. Specifically, I used scores on time 2 as the dependent variable across all analyses given I was interested in the initial effect of manipulations and that time 2 was the first time point following the manipulations. For controls, I initially used ACT/SAT, practice trial score, dispositional promotion and prevention, given that these variables had conceptual relevance. I made ACT and SAT equivalent by using the online procedure shown here: (http://www.act.org/solutions/college-career-readiness/compare-act-sat/). However, because of degrees of freedom, I was not able to include these controls into the discontinuous latent growth curve testing of the dynamic model (as discussed in the following section). Therefore, to obtain consistency between the static and dynamic models, I eliminated all covariates from the static model. Deleting these covariates and retesting the hypotheses in the static model did not alter their significance.

Test of static hypotheses. In hypothesis 1, I posited that *trait promotion focus would have a positive association with eagerness; trait prevention focus will positively relate to vigilance.* I used linear regression to test this hypothesis given that the hypothesis does not involve effects over time. Contrary to H1a, trait promotion did not exert a main effect on eagerness at time 2. Similarly trait prevention failed to influence eagerness at time 2.

In hypothesis 2a, I predicted the following: *Task incentive will exert a positive and main effect on strategy, such that eagerness task incentives will lead to eagerness strategies and vigilance task incentives will lead to vigilance strategies.* Given my interest in the relation between two constructs, I used regression in MPLUS. I found support for this hypothesis. Specifically, eagerness task incentives (as compared to neural and vigilant task incentives)

positively influenced eagerness at time 2. Additionally, vigilance task incentive (as compared to eagerness and neutral task incentives) negatively influenced eagerness at time 2.

In hypothesis 2b, I suggested that *task incentive would account for more variance in eagerness than dispositional regulatory focus.* To test for whether task incentive or dispositional regulatory focus accounted for more variance in eagerness, I evaluated this hypothesis using relative importance analysis. Given my interest in relative importance beyond the effects on just one time point, I used a composite measure of eagerness scores from time points 4-9. I used the online procedure by Scott Tonidandel and James Lebreton (shown here: http://relativeimportance.davidson.edu/multipleregression.html). Results for hypothesis 2b are shown in Table 10.

Table 10: *Relative Weights: H2b*

Predictor	β	Relative Weights	% of R^2	95% Confidence Interval for Relative Weights	
				Lower Limit	Upper Limit
Task incentive	.15**	.14*	90.87%	.07	.22
Trait promotion	.02	.01*	6.99%	.0003	.04
Trait prevention	.04**	.00*	2.14%	.0001	.02

For column with β (unstandardized regression coefficient), * Indicates p values < .01, **Indicates p values < .01. For column "Relative Weights", * indicates that zero is not included in the values between the lower and upper limit.

The unstandardized beta coefficient was significant for the effect of task incentive on eagerness. However, trait promotion had a positive and marginally significant effect on eagerness. Trait prevention significantly and positively predicted eagerness but the direction of the effect is opposite to expectations. Task incentive accounted for 90.87%, trait promotion accounted for 6.99%, and trait prevention accounted for 2.14% out of the total variance accounted for by all three variables. This indicates some support for the hypothesis that task incentive explains more variance in eagerness than trait promotion or trait prevention. However, one important caveat is that I expected trait promotion to have a positive relation with performance and trait prevention to have a negative relation with performance yet these expectations did not hold.

Hypothesis 3a suggested the following: *Metacognition and trait regulatory focus will interact to influence strategy choice. Specifically, the influence of trait regulatory focus on strategy choice will be greater when metacognition is low than when it is high* (hypothesis 3a). I used linear regression because I was interested in the effects of the independent variables on eagerness at a single time point. Contrary to expectations, the interaction between metacognition and trait regulatory focus on eagerness at time 2 did not reach significance. I also expected: *greater metacognition will result in a greater likelihood that strategies will misfit with dispositional regulatory focus* (hypothesis 3b). I created the misfit variable by first, converting the trait promotion variable, trait prevention variable, and eagerness variable to z scores so as to make the variability of the two measures equivalent. Second, taking the z scores, I computed a distance formula to obtain the two misfit variables—between trait promotion and eagerness and between trait prevention and eagerness. I regressed these misfit variables onto metacognition and the effects for both were non-significant.

In hypothesis 4, I suggested the following: *Task incentive will interact with strategy choice to influence performance: Greater performance results when strategy choice is aligned with task incentive than when it is misaligned.* I used linear regression to test this hypothesis given that it did not involve effects over time. I found full support, both when vigilance was the task incentive (as compared to neutral) and when eagerness was the task incentive (as compared to neutral). I display this interaction in Figure 3 (shown below). Simple slopes analyses indicated that when eagerness is high (+1SD), task incentive (i.e., eagerness compared to neutral and vigilant) positively predicted performance at time 2 ($\beta = 7.15$, $p < .001$) but when eagerness is low (-1SD), task incentive negatively predicted performance at time 2 ($\beta = -3.84$, $p < .001$).

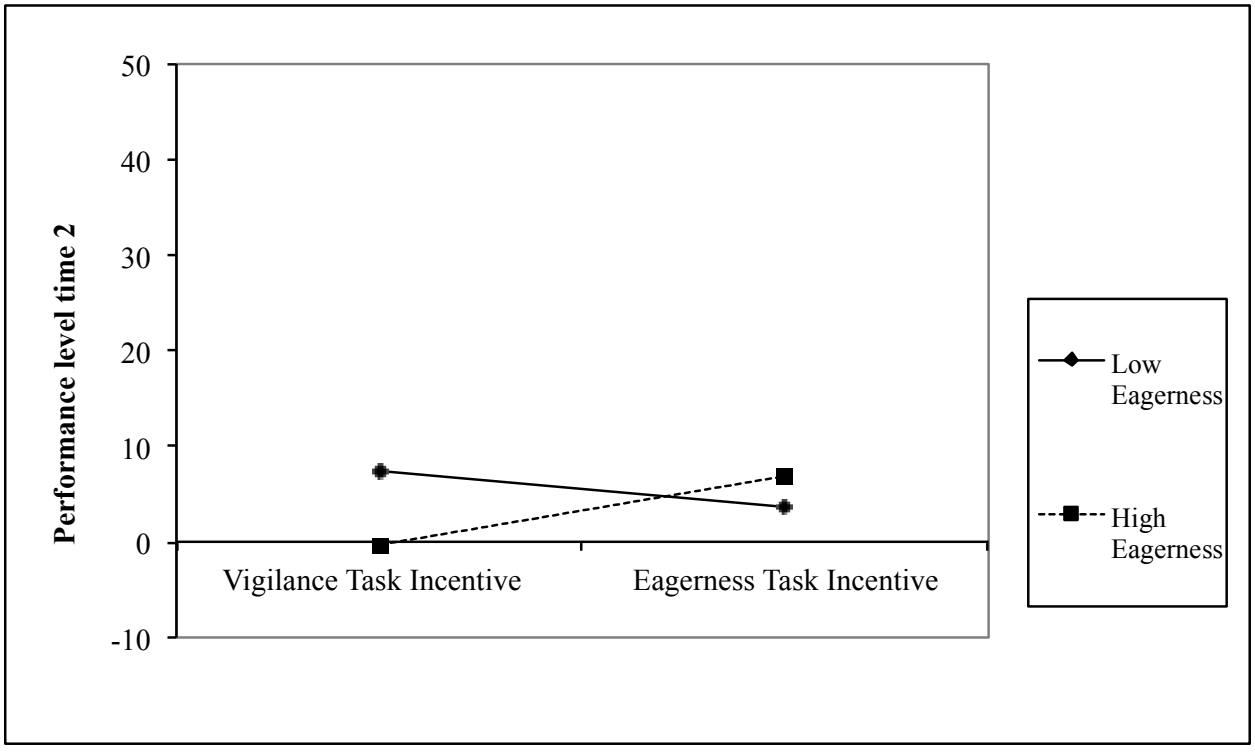

Figure 3. Pictorial representation of the interaction between task incentive and eagerness from static model (H4).

Taken together, hypotheses 2 and 4 reached significance whereas hypotheses 1 and 3 were not significant. Regarding the significant results, tests of the hypotheses for the static model provide support for the main effect of task incentive on performance as well as the interactive effect between task incentive and eagerness on performance. The analyses also provide support that task incentive accounts for more variance in performance than either trait promotion or trait prevention. However, the major caveat here is that neither trait promotion nor trait prevention predict performance.

Dynamic Model Containing Hypotheses 5-11

In the following subsection on the dynamic model, I first describe details and decisions regarding my analytic approach more generally. Second, I provide support for these decisions and present findings for each hypothesis more specifically.

Support for analytic decisions. I tested the linkages in the dynamic model by mainly relying on discontinuous latent growth curves, using MPLUS. Discontinuous latent growth curves are appropriate given the discontinuity (i.e., change in task incentive) at time 4. Discontinuous latent growth curves allowed me to model the intercepts and slope both before and after the discontinuity. They also allowed me to examine the relations between the slopes of two time-varying covariates (e.g., relation between slope of performance and slope of eagerness). This approach also allowed me to evaluate the relations between the slope of a time-varying covariate (e.g., slope of eagerness) and levels of time-invariant covariates (e.g., trait promotion). Because the discontinuity (i.e., change in task incentive) occurs at the beginning of performance trial 4, I modeled slopes both before the discontinuity (time points 1-3) and after the discontinuity (time points 4-9) for all 6 time varying covariates. These 6 time varying covariates included (1) performance, (2) eagerness, (3) state promotion, (4) state prevention, (5) fit versus

misfit between eagerness and state promotion and lastly, (6) fit versus misfit between eagerness and state prevention. Because I modeled two slopes for each of the 6 time-varying covariates, this results in 12 slopes total. We refer to the slopes before the discontinuity as the *1st slope*; we label slopes after the discontinuity as the *2nd slope*.

In contrast to the static model, I was not able to control for the same set of covariates across all hypothesis tests due to the large number of parameters being estimated and issues of convergence. Because discontinuous growth curves involve two intercepts and two slopes for each time-varying covariate, the large number of parameters being estimated can drain degrees of freedom. Therefore, in many cases, it was not possible to include the full range of covariates in the model because their inclusion led to convergence issues. However, when testing interaction hypotheses, I always controlled for both main effects.

For similar reasons, I tested each hypothesis separately. Two factors contributed to the need to test each hypothesis separately. First, the complexity and number of parameters involved in discontinuous latent growth curves places limits on testing multiple hypotheses simultaneously. Second, much of the time, the outcomes were different across the various hypotheses. When testing the dynamic hypotheses, I also excluded the neutral condition, because it was not relevant to evaluating the within-person variance. The only exception to this rule was the case where I explicitly referenced the neutral condition in hypothesis 5.

Outside of discontinuous latent growth curves, I employed certain methods to test hypotheses 8b and 8d. To evaluate 8b, I created misfit variables for each of the nine time points by going through the following two steps. First, I converted eagerness, state promotion, and state prevention to z scores. The conversion to z scores was done for each of the 3 variables separately at each of the 9 time points, leading to 27 z-scores total. Second, I used a distance formula that

first took the square of the difference between, for example, the z-score of state promotion and z-score of eagerness at time 1 and second computed the square root of this squared difference score. This same approach was used for calculating the distance between state promotion and eagerness for each of the nine time points as well as the difference between state prevention and eagerness for each of the nine time points. To evaluate hypothesis 8d, I tested nested models to examine the difference in chi-square to determine which of two variables—eagerness or state regulatory focus—demonstrated greater variance over time. In Table 11 (below), I provide the unstandardized beta coefficients, standard errors, and p values for hypotheses 5-11. The right-most column in Table 9 signals which tests of the hypotheses are contained within each model. For example, for hypothesis 8c, model 13 is comprised of both the effect of slope of eagerness before the discontinuity (time points 1-3) on eagerness slope after the discontinuity (time points 4-9) and the effect of slope of eagerness after the discontinuity (time points 4-9) on eagerness slope after the discontinuity (time points 4-9). This means that both of these effects are tested within model 1. Importantly, when testing interactions, both main effects are always included in the same model as the interaction.

Table 11

Dynamic Model Hypotheses: H5-11

Hypothesis	Source	Outcome	*β***	S.E.	p	R-Square	Models***
5a	V→E TI	SEager2	0.34	0.05	<.001	.382	Model 1
5b	E→V TI	SEager2	-0.36	0.04	<.001	.727	Model 2
6a	Dprom	SEager2	0.01	0.02	0.73	.840[11]	Model 3
6a	Dprev	SEager2	-0.01	0.02	0.64		Model 3
6a	EV	SEager2	-0.56	0.28	0.04		Model 3
6a	Dprom * EV	SEager2	-0.05	0.03	0.17		Model 3
6b	Dprev * EV	SEager2	0.03	0.03	0.64		Model 3
7	Meta*EV	SEager2	0.00	0.02	1.00	.693[12]	Model 4
7	Meta*EV	SEager1	-0.05	0.03	0.06	.593[13]	Model 4
8a	------	1st slope of misfit with state promotion, averaged across individuals	-0.26	0.05	< .001	NA	Model 5
8a	------	1st slope of misfit with state prevention, averaged across individuals	-0.25	0.04	< .001	NA	Model 6
8a	------	2nd slope of misfit with state promotion, averaged across individuals	-0.48	0.09	< .001	NA	Model 7

[11] This R-Square refers to the influence of the entire set of predictors—all three main effects and the two interactions—on the 2nd curve eagerness slope;

[12] This R-Square captures all of the set of predictors—including interactive and main effects of task incentive and trait metacognition—on 2nd slope of eagerness.

[13] This R-Square captures all of the set of predictors—including interactive and main effects of task incentive and trait metacognition—on 1st slope of eagerness.

Table 11 (cont'd)

8a	------	2nd slope of misfit with state prevention, averaged across individuals	-0.44	0.08	< .001	NA	Model 8
8b	First slope of misfit between state promotion and eagerness[14]	SSPM2	-13.29	10.89	0.22	.030	Model 9
8b	First slope of misfit between state promotion and eagerness	SSPV2	0.12	0.91	0.89	.002	Model 10
8b	First slope of misfit between state prevention and eagerness[15]	SSPM2	10.15	7.04	0.15	.674	Model 11
8b	First slope of misfit between state prevention and eagerness	SSPV2	-1.05	1.49	0.48	.030	Model 12
8c	SEager2	SSPM2	5.65	6.14	0.36	.506[16]	Model 13
8c	SEager1	SSPM2	7.54	8.33	0.37		Model 13
8c	SEager2	SSPV2	6.37	4.38	0.15	.240[17]	Model 14
8c	SEager1	SSPV2	3.78	2.78	0.17		Model 14
9	EV	Sperf2	7.93	1.58	< .001	NA	Model 15
9	SEager2	Sperf2	18.28	6.74	0.01	NA	Model 15
9	EV*SEager2	Sperf2	-12.52	4.86	0.01	NA	Model 15

[14] Higher numbers mean greater misfit.

[15] Higher numbers mean great fit.

[16] This R-Square refers to the effect of Eagerness slope 1 and Eagerness slope 2 on state promotion slope 2.

[17] This R-Square refers to the effect of Eagerness slope 1 and Eagerness slope 2 on state promotion slope 2.

Table 11 (cont'd)

10a	SEager2 * SSPM2	Sperf2	-42.67	23.81	0.07	NA	Model 16
10b	SEager2 * SSPV2	Sperf2	-21.48	7.03	0.00	NA	Model 17
11	EV	SEager1	0.51	0.04	<.001	.615	Model 18
11	EV	SEager2	-0.70	0.05	<.001	.827	Model 18

***This column serves to indicate what dynamic hypotheses are tested in each model. For example, model 13 contains both the effect of the eagerness slope before the discontinuity on slope of performance after the discontinuity as well as the effect of the eagerness slope after the discontinuity on slope of performance after the discontinuity. When testing interactions, both main effects are always included in the same model as the interaction. **Indicates that the β represents unstandardized coefficient. V→E TI = Vigilance to eagerness task incentive as compared to static neutral condition; E→V TI = Eagerness to vigilance task incentive as compared to static neutral condition; EV = eagerness to vigilance task incentive as compared to vigilance to eagerness task incentive; Dprom * EV = interaction term between trait promotion and eagerness task incentive (versus vigilance task incentive). Dprev * EV = interaction term between trait prevention and eagerness task incentive (versus vigilance task incentive). Meta*EV = interaction of metacognition manipulation and task incentive; SEager1 = Slope of eagerness before discontinuity (time points 1-3); SEager2 = Slope of eagerness after the discontinuity (Time points 4-9); SSPM2 = Slope of state promotion after discontinuity (time points 4-9); SSPV2 = Slope of state prevention after the discontinuity (Time points 4-9); Sperf2 = Slope of performance after the discontinuity (time points 4-9).

Test of hypotheses. In hypothesis 5, I suggested that: *Over time, a shift in task incentive from vigilance to eagerness will induce strategy switching in the direction from vigilance to eagerness. This shift will be significantly greater than for individuals who do not face a shift in task incentive. (5a). A shift in task incentive from eagerness to vigilance will induce strategy switching in the direction from eagerness to vigilance. This shift will be significantly greater than for individuals who do not face a shift in task incentive (5b).* In other words, shifts in task incentive would predict the slope of eagerness after the discontinuity. To test this hypothesis, I used discontinuous latent growth curves because it allowed me to model the effect of task incentive on the slope of eagerness *after* the discontinuity. I tested 5a and 5b using two different models. In support of H5a, a change in task incentive from vigilance to eagerness (as compared to a neutral and constant task incentive) positively predicted the slope of the second eagerness

curve. In support of H5b, tests showed that a change from eagerness to vigilance task incentive negatively predicted the slope of the second curve of eagerness.

In hypothesis 6, I suggested that: trait regulatory focus and change in task incentive would interact to predict the slope of eagerness. Specifically, *Trait promotion will exert a positive effect on the degree to which individuals adapt strategies to align with changes in task incentive (H6a)*. *Trait prevention will exert a negative effect on the degree to which individuals adapt strategies to align with changes in task incentive (H6b).* Because I was primarily interested in the slope of eagerness after the discontinuity, I used discontinuous latent growth curves, testing 6a and 6b in the same model. Contrary to H6a, the interaction between trait promotion and task incentive failed to significantly influence the second slope of eagerness. The parallel prediction with trait prevention was also not supported. Contrary to H6b, trait prevention and task incentive also failed to significantly predict the slope of the second slope of eagerness.

Regarding hypothesis 7, I expected the following: *Metacognition will interact with change in task incentive to influence strategy adaptation. Specifically, greater metacognition will strengthen the positive relationship between changes in task incentive and strategy adaptation whereas less monitoring will weaken it.* Again, the outcome is a slope comprised of indicators that all happen after the discontinuity; therefore, I used discontinuous latent growth curves. Contrary to hypothesis 7, the interaction between metacognition and changes in task incentive failed to significantly predict the second slope of *eagerness*. However, metacognition and task incentive did interact to predict the second eagerness slope but the effect was marginal and the sign was opposite of expectations.

Turning to hypothesis 8, I predicted a set of four predictions (8a, 8b, 8c, and 8d) about the interconnections between changes in strategy and changes in state regulatory focus below.

Beginning with hypothesis 8a, I predicted that *when individuals choose a strategy that misfits their regulatory focus, state regulatory focus will later change to align with the strategy and result in regulatory fit.* In other words, those who initially faced misfit will experience a downward slope in misfit. The slope in misfit occurs after the discontinuity, supporting my decision to use discontinuous latent growth curves. I tested this hypothesis using four different models: (1) The first model involved the 1st slope of misfit between state promotion and eagerness, (2) The second model involved the 1st slope of misfit between state prevention and eagerness, (3) The third model involved the 2nd slope of misfit between state promotion and eagerness, (4) The final model involved the 2nd slope of misfit between state prevention and eagerness. In hypothesis 8a, I was interested in whether those who "initially chose a strategy that misfit their regulatory focus" would experience a downward slope in misfit. To capture those who initially experienced misfit, I included only those individuals who experienced above average misfit. Although the above average cutoff may seem somewhat arbitrary, these kinds of decisions were needed in order to provide specificity to the hypothesis. I then regressed the second slope of misfit onto the first slope of misfit. I found mixed support for hypothesis 8a. Consistent with expectations, I found that, *for the misfit variable between state promotion and eagerness,* slope of curve 1 and slope of curve 2 were negative and significant*. Given that for distance between state promotion and eagerness, higher scores indicate greater misfit,* a negative slope indicates an increase in *fit* over time. Contrary to expectations, I found that, *for the misfit variable between state prevention and eagerness*, the slope of curve 1 and slope of curve 2 were negative and significant. Given that for distance between state prevention and eagerness, higher scores denote greater fit, a negative slope would indicate an increase in *misfit*

over time. All in all, this pattern of relations is largely in contrast to the notion that participants will increase in fit over the course of the experiment.

Moving to hypothesis 8b, I predicted that: *The greater that state regulatory focus misaligns with strategy, the more rapid the change in state regulatory focus.* In other words, the first slope of misfit (*before* the discontinuity) would positively predict the slope of state promotion and state prevention focus (*after* the discontinuity). I once again used discontinuous latent growth, which was particularly relevant here given the need to model relations between variables before and after the discontinuity. To evaluate this hypothesis, I ran four separate models: (1) Regress first slope of state promotion onto the first slope of misfit between state promotion and eagerness, (2) Regress second slope of state prevention onto the first slope of misfit between state promotion and eagerness, (3) Regress second slope of state promotion onto the first slope of misfit between state promotion and eagerness, (4) Regress second slope of state prevention onto the first slope of misfit between state prevention and eagerness. Contrary to hypothesis 8b, none of these models reached significance.

In hypothesis 8c I predicted the following: *There will be an indirect effect of changes in task incentives on changes in state regulatory focus through strategy switching.* In other words, change in task incentive will predict slope of state promotion and slope of state prevention (after the discontinuity) via the slope of eagerness (after the discontinuity). Baron and Kenny (1986) put forth three conditions that are necessary for mediation: (1) significant relation between IV and mediator, (2) significant relation between mediator and outcome, and (3) significant relation between IV and outcome. Kenny, Kashy, and Bolger (1998) suggest that the final requirement—relation between IV and outcome—is overly stringent. However, the first two requirements remain important conditions for mediation to occur. To evaluate these first two necessary

conditions with respect to H8c, I used discontinuous latent growth curves given that the outcome is a slope comprised of indicators following the discontinuity. The second necessary condition was unsupported; the first slope of eagerness was not a significant predictor of the second slope of state prevention and state promotion. Because the direct effect from mediator to outcome was non-significant, I did not go on to test the indirect effect as consistent with Kenny, Kashy, and Bolger (1998) and Baron and Kenny (2003).

In hypothesis 8d, I suggested the following: *Changes in strategies will be more rapid and greater in magnitude than changes in state regulatory focus.* To evaluate this hypothesis, I needed to use an approach that would evaluate whether or not eagerness had a *significantly* steeper slope than state promotion or state prevention. The hypothesis can be thought of as a comparison between two nested models: One in which eagerness slope is steeper than state regulatory focus, and the other one in which eagerness slope is constrained to be equal to state regulatory focus. Because the two models are nested, I used linear hypothesis testing and examined the relative fit of the two models. Specifically, I created two nested models: (1) two reference models—(1a) one in which variance over time of state promotion focus and eagerness were equal and (1b) another in which variance over time of state prevention focus and eagerness were equal, and (2) two comparison models: (2a) one in which variance of eagerness over time was greater than the variance of state promotion, and (2b) another in which variance of eagerness over time was greater than variance of state prevention. I used chi-square difference tests to evaluate which model best fit the data. As shown in Table 12 (below), there was no significant difference between these two models for either the two nested models with state prevention or the two nested models with state promotion. This indicates no significant differences in variance

between eagerness and state prevention or between eagerness and state promotion. Thus, 8d was not supported.

Table 12: *Linear Hypothesis Testing (Hypothesis 8d)*

Hypothesis		df	Chi-square value	P value	Chi-square difference df	DF difference	Chi-square difference p value
8d	Comparison model (state prevention variability over time > Eagerness variability over time)	148	325.16	p < .0001	.34	1	p = .60
8d	Reference model (variability between prevention and eagerness over time is equal)	149	325.13	p <.0001			
8d	Comparison model (state promotion variability over time > Eagerness variability over time)	148	340.88	p <.0001	.37	1	p = .54
8d	Reference model (variability between promotion and eagerness over time is equal)	149	340.84	p < .0001			

Hypothesis 9 suggested the following: *Changes in task incentive will interact with changes in adaptation to influence performance. Specifically, strategy adaptation (eagerness to vigilance, vigilance to eagerness, or no change) that reflects changes in task incentive (eagerness task incentive to vigilance task incentive, vigilance task incentive to eagerness task incentive, or no change) will lead to greater performance outcomes than when strategy adaptation does not mirror task incentive changes.* I once again used discontinuous latent growth curves to model the slope of multiple variables following the discontinuity. To test this prediction, I used a single model, which included the main effects and interaction. The results are generally supportive of this expectation: we found that the second slope of eagerness moderated the positive relationship between task incentive and the second slope of performance. As shown in Figure 4, the result suggests that the effect of slope of eagerness on slope of performance depends on the task incentive. Simple slopes analysis revealed that when eagerness is high (+1SD), task incentive is not predictive of performance ($\beta = 3.41$, $p = .27$) but when eagerness is low (-1 SD), task incentive predicts an increase in performance ($\beta = 13.30$, $p <. 001$).

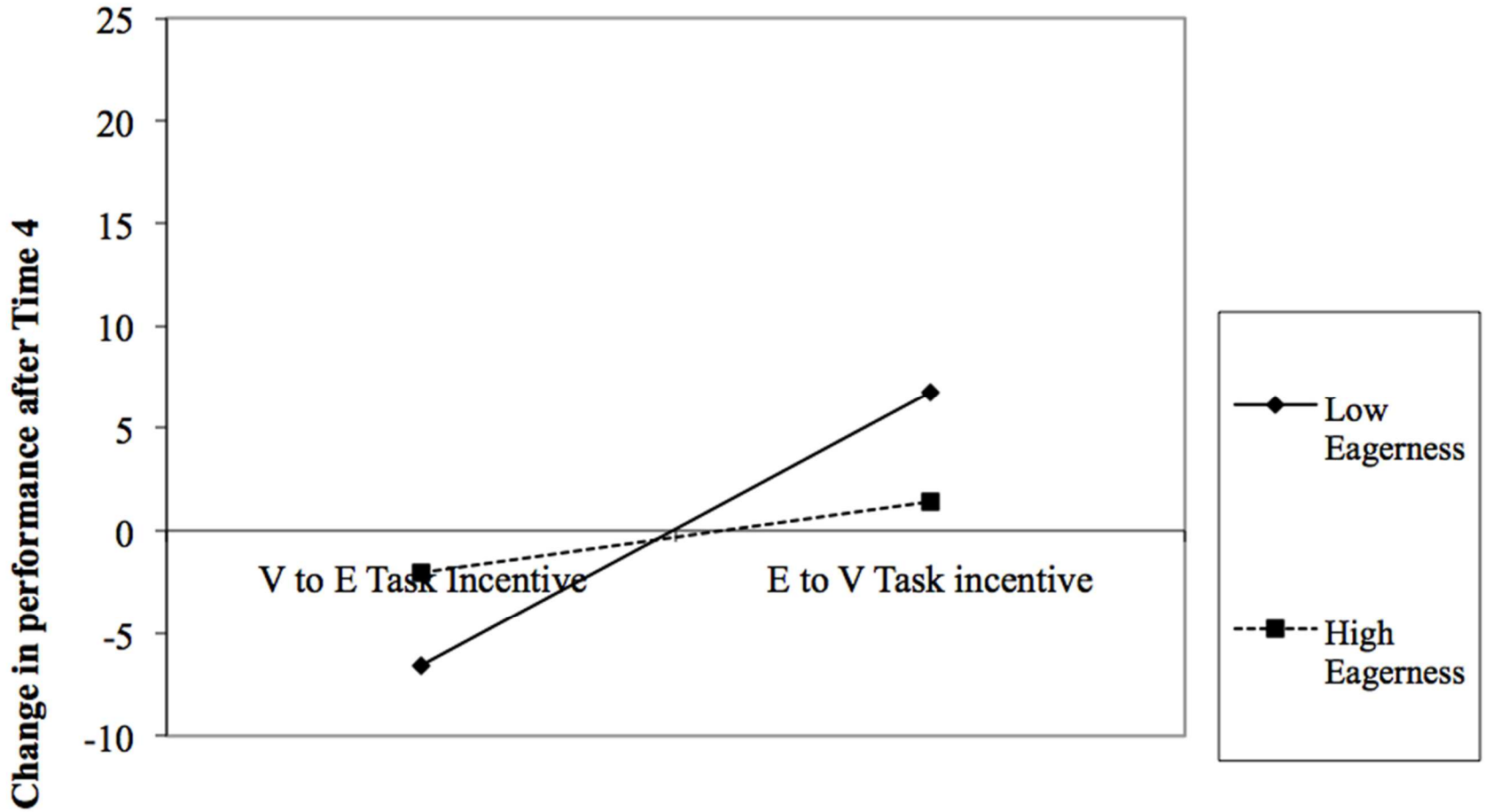

Figure 4. Within-person relationship between task incentive and performance moderated by eagerness (H9; from dynamic model).

In hypothesis 10 I suggested that: *Strategy adaptation will interact with changes in state regulatory focus to influence performance. Specifically, changes in state regulatory focus will have a more positive impact on performance when they are in the same direction as changes in strategy versus when they are in an opposite direction to changes in strategy.* Using discontinuous latent growth curves to model slopes following the discontinuity, I used two different models to test hypotheses 10a and 10b. Hypothesis 10a suggested that the second slope of eagerness and the second slope of state promotion would interact to influence the second slope of performance. I found a marginally significant interaction, though the interaction was opposite to the prediction. Specifically, the second slope of state promotion weakens the effect of the second slope of eagerness on performance. Hypothesis 10b suggested that the second slope of eagerness and the second slope of state prevention would interact to influence the second slope of performance. This interaction, depicted in Figure 5 below, was significant. Simple slopes analysis revealed that when state prevention is high (+1SD), eagerness is *negatively* but not significantly related to performance (β = -.12, p = .81) and when state prevention is low (-1 SD), eagerness is *positively* but not significantly related to performance (β = .12, p = .82)

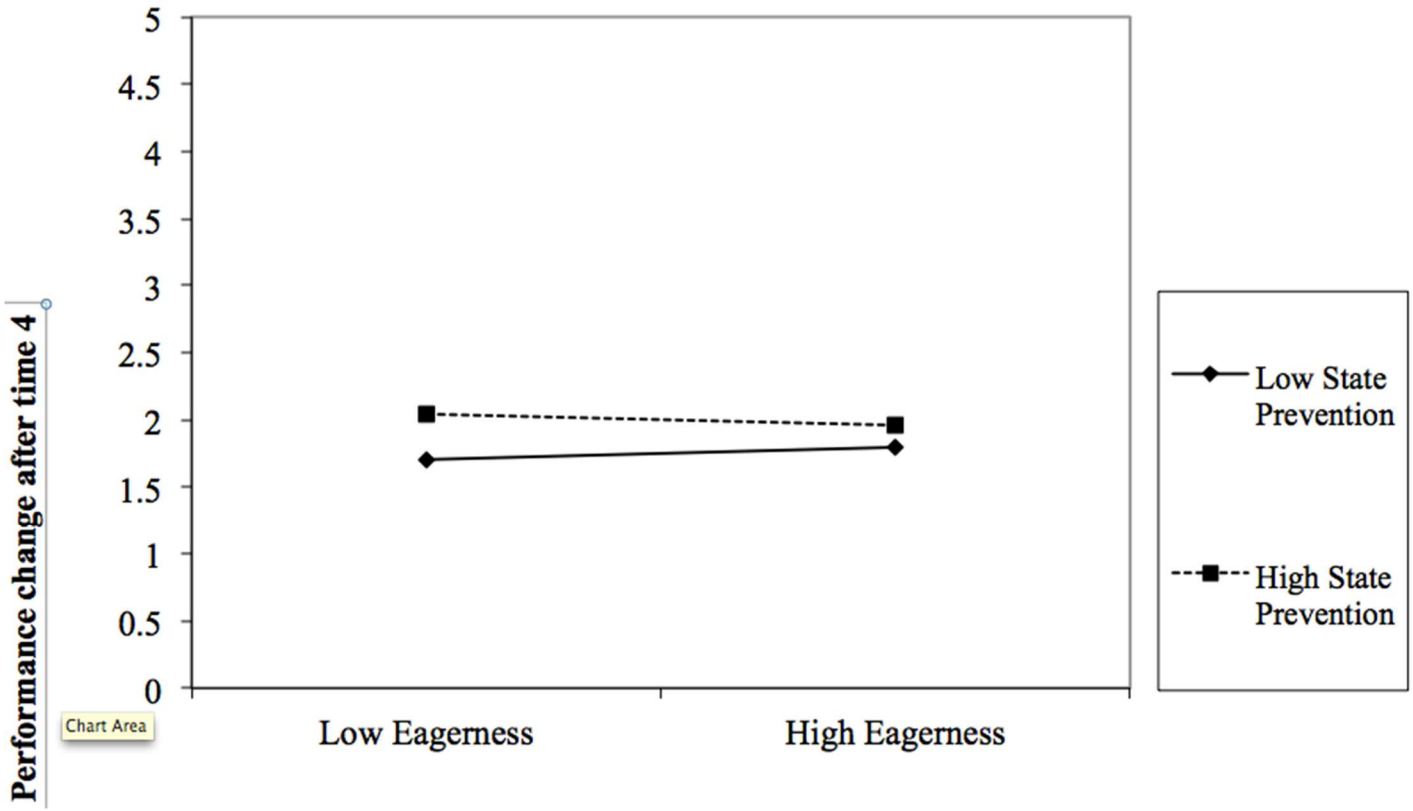

Figure 5. Within-person relationship between eagerness and performance moderated by state prevention (H10b; from dynamic model).

In hypothesis 11a, I expected that *before a switch in task incentive (i.e., times 1, 2, and 3), strategy choice will change in the direction of the current task incentive over time.* In hypothesis 11b, I expected that *after a switch in task incentive (i.e., times 4, 5, and 6), strategy choice would change in the direction of the current task incentive over time.* Using discontinuous latent growth curves to include the eagerness slope before and after the discontinuity, I used a single model to test both predictions. Significance tests of this hypothesis were supportive in both cases. The eagerness to vigilance task incentive (as compared to vigilance to eagerness task incentive) significantly predicted increases in eagerness before the discontinuity and decreases in eagerness after the discontinuity.

Taken together, dynamic hypotheses 5, 9, 10b, and 11 were supported, dynamic hypothesis 8a received mixed support, and dynamic hypotheses 6, 7, and 10a were unsupported. The results provide support for the effects of task incentive change and slope of eagerness (and their interaction) on slope of performance. I found scant support, however, for the effects of state regulatory focus or the effects of misfit on performance.

Exploration of Methodological Issues

Given the multitude of non-significant results, I combined my own speculations with careful analysis to identify methodological issues and gauge their potential impact on the results. In Appendix I, I provide a full description of each issue, the analyses used to diagnose them, and their potential influence on results. I also summarize the methodological issues here.

One particularly noteworthy methodological issue involves the measurement of vigilance. I conceptualized the strategy construct as a single variable ranging from eagerness (at the top) to vigilance (at the bottom). The number of targets shot (compared to targets designated as peaceful) served as the measure of strategy. This measure, however, does not directly contain

information about how careful participants were in making shoot versus no shoot decisions. For example, accuracy is often used as an indicator of vigilance yet the number of targets shot does not contain information about accuracy. Strategy is a central variable in my model and is important for making the intended contributions. Therefore, the failure to directly measure the vigilance side of this variable likely has wide-ranging implications in terms of its impact on the results.

A related concern is the bipolar nature of the eagerness measure; I intended higher scores to indicate eagerness and lower scores to indicate vigilance. The bipolar nature is problematic because, in order to operationalize regulatory fit, I needed to compare a bipolar scale (i.e., eagerness) with a scale that is broken into two separate variables (i.e., state promotion focus and state prevention focus). Comparing one bipolar scale with two separate variables creates challenges because it results in making two separate calculations of distance using the same bipolar variable.

The failure to adequately detect vigilance strategies makes it difficult to evaluate hypotheses that reference vigilance strategies. The purpose of Table 13 (hypotheses from static model) and Table 14 (hypotheses from dynamic model) below is to identify those hypotheses that, in retrospect, cannot be readily evaluated because of the issue with detecting vigilance strategies. In the left-most column, I state the hypothesis. Then, in the middle column I describe whether the hypothesis can be (1) fully evaluated, (2) partially evaluated, or (3) cannot be evaluated at all. Partially evaluated means that some but not all of the relationships embedded in a hypothesis can be directly tested. In the right-most column, I describe what relationships cannot be tested.

The main takeaway from the tables is that the hypotheses cannot be fully evaluated due to the concern with detecting vigilance strategies. In other words, the difficulty in operationalizing vigilance results in problems for evaluating the relationships across all hypotheses. This results in an incomplete test of the hypotheses, which is problematic for making all four intended contributions.

Table 13: *The Capability of Evaluating Specific Hypotheses of Static Model*

Hypothesis	Hypothesis can be evaluated (fully, partially, not at all)	What relationship cannot be adequately tested
1: Main effect of trait regulatory focus: Trait promotion focus will have a positive association with eagerness strategy; trait prevention focus will positively relate to vigilance.	Partially	Effect of trait prevention on vigilance
2a: Task incentive will exert a positive and main effect on strategy choice, such that eagerness task incentives will lead to eagerness strategies and vigilance task incentives will lead to more use of vigilance strategies.	Partially	The effect of vigilance task incentives on vigilance strategies
2b: Task incentive will account for more variance in strategy choice than dispositional regulatory focus.	Partially	The relative importance of task incentive compared to vigilance strategies
3a: Metacognition and trait regulatory focus will interact to influence strategy choice. Specifically, the influence of trait regulatory focus on strategy choice will be greater when metacognition is low than when it is high.	Partially	The interactive effect between metacognition and trait regulatory focus on vigilance strategies
3b: Although not incorporated into the model, we expect that greater metacognition will result in a greater likelihood that strategies will misfit with dispositional regulatory focus.	Partially	The effect of metacognition on misfit between trait prevention and vigilance strategies

Table 14: *The Capability of Evaluating Specific Hypotheses of Dynamic Model*

Hypothesis	Extent to which hypothesis can be evaluated (fully, partially, not at all)	What relationship cannot be fully tested
5a: Task incentive shifts from eagerness to vigilance will induce greater eagerness switching than those who do not receive a change in task incentive	Partially	The effect of eagerness to vigilance task incentive (compared to neutral task incentive) on changes in vigilance strategies over time.
5b: Task incentive shifts from vigilance to eagerness will induce greater eagerness switching than those who do not receive a change in task incentive	Partially	The effect of vigilance to eagerness task incentive (compared to neutral task incentive) on changes in vigilance strategies over time.
6: Trait promotion will exert a positive effect (and trait prevention will exert a negative effect) on the degree to which individuals adapt strategies to align with changes in task incentive.	Partially	The interactive effect of trait prevention and task incentive on slope of vigilance following discontinuity.
7: Metacognition will interact with change in task incentive to influence eagerness adaptation. Specifically, greater metacognition will strengthen the positive relationship between changes in task incentive and eagerness adaptation whereas less monitoring will weaken it.	Partially	Interactive effect between metacognition and changes in task incentive on changes in vigilance strategies over time.
8a: When individuals initially choose an eagerness strategy that misfit their regulatory focus, state regulatory focus will later change to align with the strategy and result in regulatory fit.	Partially	The positive effect of time on regulatory fit between vigilance strategies and state prevention focus.
8b: The greater that state regulatory focus misaligns with strategy, the more rapid the change in state regulatory focus.	Partially	Effect of slope of misfit between state prevention and vigilance strategies before the discontinuity on the slope of state prevention after the discontinuity

Table 14 (cont'd)

8c: There will be an indirect effect of changes in task incentives on changes in regulatory focus through eagerness switching.	Partially	The indirect effect of task incentive on changes in state prevention focus via changes in vigilance strategies
8d: Changes in strategies will be more rapid and greater in magnitude than changes in state promotion or state prevention.	Partially	Changes in vigilance strategies will be more rapid and greater in magnitude than changes in state promotion or state prevention
9: Changes in task incentive will interact with the second slope of eagerness to influence the second slope of performance. Specifically, slope of eagerness that reflects changes in task incentive (E→V, V→ E, or no change) will lead to greater performance outcomes than when strategy adaptation does not mirror task incentive changes.	Partially	Interactive effect between changes in vigilance and task incentive on changes in performance
10a: strategy adaptation will interact with second slope of state promotion focus to influence the second slope of performance. Specifically, changes in state promotion focus will have a more positive impact on performance when they are in the same direction as changes in strategy versus when they are in an opposite direction to changes in strategy.	Partially	Interactive effect between changes in vigilance and changes in state promotion on changes in performance
10b: strategy adaptation will interact with second slope of state prevention focus to influence the second slope of performance. Specifically, changes in state prevention focus will have a more positive impact on performance when they are in the same direction as changes in strategy versus when they are in an opposite direction to changes in strategy.	Partially	Interactive effect between changes in vigilance and changes in state prevention on changes in performance.
11: Expected that changes in task incentive would positively predict the first slope of eagerness (Hypothesis 11a) and second slope of eagerness (Hypothesis 11b).	Partially	The effect of task incentive on changes in vigilance before and after the discontinuity.

Other methodological issues are also important and I briefly discuss them here. First, I conducted the experiment towards the end of the semester when participants are under high stress and often are less conscientiousness, which could have affected the results. Second, my experiment involves examining within-person effects. Learning effects or fatigue effects, if present, could serve as alternative explanations for the expected pattern of performance over time. Analyses indicated that both learning and fatigue effects were present (shown in Appendix J). Third, there were validity issues in measuring trait and state regulatory focus, as these measures did not exhibit the expected pattern of correlation with other constructs. Fourth, there are multiple ways to operationalize strategy and I chose a method based on signal detection theory. An alternative method of operationalizing strategy is by using speed (to indicate eagerness) and accuracy (to indicate vigilance). Finally, state regulatory focus was not manipulated in the experiment and doing so could have better allowed me to find the expected pattern of results regarding regulatory fit.

DISCUSSION

In this study I aimed to understand the within-person fluctuations present in regulatory focus and eagerness from a social-cognitive perspective. Although most research focuses on between-person differences, there are likely within-person fluctuations in regulatory focus and eagerness. These fluctuations are important to study because, as I argue in this thesis, they may prove critical to understanding the origin of state regulatory focus and eagerness (contribution 1), to rethink regulatory fit as a process that unfolds over time (contribution 2), to account for more variance in performance (contribution 3), and to understand potential tradeoffs between 'what feels right' and 'what is most effective' (contribution 4). In attempting to make these contributions, I integrate regulatory focus theory with social-cognitive theory into a dynamic framework of regulatory focus.

Summary of Findings

As is consistent with expectations for the static model, eagerness incentives triggered eagerness strategies and vigilance incentives triggered vigilance strategies. Further, the extent to which eagerness or vigilance predicted performance depended on the reward structure of the task. Those employing eagerness, for example, performed better when eagerness task incentives were present than when vigilance task incentives were present.

The above pattern of significant relationships also played out over time. As the environment transitioned from eagerness to vigilance incentives, individuals also shifted from eagerness to vigilance. As predicted, a switch from eagerness to vigilance was most fruitful when the incentive also changed from eagerness to vigilance. In this way, the effect of this change from eagerness to vigilance affecting performance depended on the presence of a parallel change in incentive.

Explanation of Findings

I begin with making sense of results for the static model (hypotheses 1-4) and conclude with interpreting findings for the dynamic model (hypotheses 5-11).

Static model. In this section I interpret results of the static model in the following order: (1) main effect of incentive structure on eagerness, (2) interaction between incentive structure and eagerness on performance, (3) the role of metacognition, and (4) the effects of trait regulatory focus.

The main effect of incentive on eagerness provides some information about the flexible way that people adapt strategies to existing incentive structures. Within the experiment, an eagerness incentive structure incentivized agents to respond with eagerness whereas vigilance incentive structure incentivized agents to respond with vigilance. The relation between incentives and strategy suggests the following: First, in striving to perform well, individuals pay attention to and are capable of observing incentives in the environment. Second, those individuals who observe eagerness incentives will tend to use eagerness strategies whereas those who observe vigilance incentives will tend to use vigilance strategies. In other words, people flexibly calibrate their strategies in alignment with current incentive structures. The predictive power of task incentive in adopting strategies is somewhat consistent with extant findings. For example, Maddox, Baldwin, and Markman (2006) investigated a similar construct called task structure—or "the gains and losses associated with the task" (p. 1378). To manipulate *gains*, correct responses yielded a gain of 2 points and incorrect responses prompted a loss of 1 point. To manipulate losses, correct responses yielded a 1-point gain and incorrect responses prompted a 3-point loss. Given that people flexibly adapt strategies based on incentive structure, one would

expect that those who adopt strategies congruent with incentive structure would be most effective.

Consistent with this expectation, we found that the interactive effect of strategies and incentive structures influences performance, which suggests that both constructs play a role in determining how well people perform. Those who adopt strategies to be congruent with initial task incentives will perform better than those who adopt strategies that are incongruent with initial incentives. The interactive effect between task incentive and performance suggests that incentives play an important role in shaping performance. In order to perform well, Individuals must take into consideration not only the task incentive but also their attention to being aggressive or careful in their task decisions. These results are consistent with calls to examine fit when taking into consideration environmental factors (Camacho, Higgins, & Luger, 2003). These findings are also consistent with results described in the preceding paragraph by Maddox, Baldwin, and Markman (2006) who manipulated the reward structure of the task. They found that fit between the task structure (i.e., gain versus loss) and state regulatory focus (i.e., promotion, prevention) led to greater learning and quicker adoption of optimal strategies than misfit between task structure and state regulatory focus.

Contrary to our expectations, metacognition and trait regulatory focus had non-significant relations with outcomes. First, metacognition had non-significant relations with trait regulatory focus and strategy. The null support for effects of metacognition could be due to methodological or theoretical reasons. The metacognitive manipulation positively predicted participant's state metacognition suggesting that the induction is working. However, other methodological factors that could be affecting the null results include invalid measurement of trait regulatory focus, questionable operationalization of strategy, as well as the general difficulty to observe nuanced

effects during end of semester when participants are less conscientious. Theoretical reasons may also account for the null results. Theoretical speculation, for example, could be that metacognition does not play a central role in explaining the origin of strategies and state regulatory focus. To disentangle whether the results are due to methodology or theory, future research should evaluate the role of metacognition using different methods.

In line with the view of metacognition as an active awareness of the goal regulation process (Brown, Bransford, Ferrara, & Campione, 1983), I provide the following ideas for boosting metacognition. One way to cultivate more active awareness of goal progress is through real-time feedback that provides participants with their current performance levels in relation to the goal. This real-time feedback could help individuals to more quickly be aware of and adjust their strategies during trials. In order to make the real-time feedback more salient, researchers could ask participants to answer questions about when and why the real-time feedback changed over the course of a single trial. The aim of this survey would be to further enhance monitoring on the next trail. The hope is that, by using real-time feedback, this induction of metacognition would promote higher levels of metacognition than simply conveying feedback at the end of each trial. Another induction of metacognition could be to more thoroughly explain the benefits of metacognition (e.g., enhanced academic performance) and to put participants through an intense training to modify their metacognitive habits. The training could involve asking participants to pick an initial strategy and to closely monitor the outcomes associated with that strategy. Then, the trainer could ask participants to reflect about whether or not a new strategy is needed and if so, what other strategies come to mind that could be implemented in subsequent rounds. Future research could evaluate the extent to which these metacognition inductions are successful in influencing metacognition.

Second, the effect of trait regulatory focus on eagerness strategies was non-significant yet this relation is fundamental to regulatory focus theory (Higgins, 2000). In order to satisfy needs of development and advancement, those who are chronically promotion-oriented tend to adopt eagerness strategies that involve aggressively pursuing positive outcomes. In order to satisfy needs of security, responsibility and safety, chronically prevention-oriented individuals may adopt a vigilance strategy that involves being cautious to prevent threats.

It is not clear what is driving these null results of trait and state regulatory focus with strategy. One could attribute these findings to either theoretical or methodological problems. The latter is most probable given the various methodological issues mentioned above (e.g., failure to capture vigilance strategy, operationalization of eagerness and trait regulatory focus). In particular, the failure to capture the vigilance side of strategy makes it difficult to adequately test the effect of state and trait regulatory focus on strategy. If I had measured vigilance strategies, I may have found that trait and state prevention focus predicts vigilance strategies.

The non-significant results mean that fundamental aspects of regulatory focus theory are unsupported. They are inconsistent with the building blocks of regulatory focus theory and are methodologically driven; therefore they hamper the potential of the experiment as a whole to shed light on regulatory focus theory. Taken together, the significant results, described earlier in the section, suggest that individuals are observing incentive structures in the task and responding with the corresponding strategy in order to maximize performance. The non-significant results are problematic in that they limit the experiment as a whole for shedding light on regulatory focus theory.

Dynamic Model

In this section I interpret results for the dynamic model. Specifically, I assign meaning to results that were expected and discuss whether unsupported hypotheses are a function of theoretical or methodological issues. The dynamic model comprises much of the four core contributions of this research; therefore, I organize this section based on these contributions.

Contribution 1: origin of within-person fluctuations. The effects of task incentive on strategy is relevant to the first contribution—which is understanding the main and interactive effects of personal constructs and situational factors on within-person changes in regulatory focus and strategy. Changes in this environmental feature (e.g., vigilance to eagerness task incentive or eagerness to vigilance task incentive) prompts individuals to adapt their eagerness versus vigilance strategies in the corresponding direction. This finding suggests that people are paying attention not only to the task incentive itself but also to how that task incentive changes over time. This finding is consistent with the idea that there can be multiple kinds of fit other than just fit between regulatory focus and strategy. Future research should attend to other situational and personal factors that are predictive of within-person changes in strategy and state regulatory focus as well as other kinds of fit that are predictive of outcomes.

Contribution 2: regulatory fit as within-person process. In general, results were not supportive of contribution 2. Contribution 2 suggests that regulatory fit is a phenomenon that, in addition to occurring between persons, can occur within-subjects. Embedded in this contribution, I also suggest that strategy exerts a bottom-up influence on state regulatory focus.

Contrary to expectations, results were not supportive of contribution 2. Beginning with fluctuations in regulatory fit, I found mixed support for the notion of change in regulatory fit over time. Consistent with expectations, I found that the first and second slope were negative and

significant *for the misfit variable between state promotion and eagerness*, indicating an increase in *fit* over time. Contrary to expectations, I found that the first and second slope were negative and significant *for the misfit variable between state prevention and eagerness*. This indicates an increase in *misfit* over time. This pattern of relations runs counter to expectations, and given the measurement and operationalization issues embedded in state regulatory focus and eagerness, the counterintuitive results are likely a function of methodological issues. Consequently, I view the within-person fluctuations in regulatory fit as not supportive of contribution 2.

In general, I do not believe the methodology used was adequate to detect the nuanced interplay of regulatory fit over time. One main culprit could be the failure to detect vigilance strategies. The phenomenon of regulatory fit suggests that people experience 'feeling right' as a result of matches between their regulatory focus and strategy. The vigilance side is an important component in creating this experience, and therefore, a failure to capture vigilance could undermine the ability of the experimenter to replicate the notion of regulatory fit. In turn, this makes it difficult to evaluate whether or not regulatory fit can fluctuate over time. Other methodological issues—such as poor operationalization of strategy and regulatory focus and potential time confounds such as learning or fatigue effects—could have also played a role. Additionally, I did not manipulate the degree of regulatory fit over time; I only manipulated task incentive—which is predictive of eagerness—and I did not directly induce state regulatory focus. I still expected to observe change in regulatory fit over time for the following reasons. I expected that, as the task incentive changes, the level of eagerness would also change. However, as eagerness changed, I did not expect an immediate change in state regulatory focus given my theorizing that state regulatory focus is more stable than eagerness. This would result in temporary experiences of regulatory misfit that would later lead to experiences of regulatory fit.

Unfortunately, I did not see this pattern of results. It is possible that, by inducing changes in regulatory fit over time, future researchers might be able discern whether regulatory fit can change over time.

The possibility still exists that, contrary to my theorizing, regulatory fit is stable over time. It could be that, for example, a change in state regulatory focus prompts an almost simultaneous change in strategy, leading to no real change in regulatory fit levels over time. Although the current experiment cannot shed much light on this issue, future research should evaluate the temporal stability of regulatory fit and the mechanisms by which it changes.

Contribution 3: within-person variance predicting performance. Another kind of fit is between task incentive and strategy. This concerns the third contribution—or the extent to which changes in strategy, changes in task incentive, and changes in state regulatory focus exert main and interactive effects on performance. Fit between task incentive and strategy does predict performance in the expected direction. From a conceptual standpoint this means that those who flexibility adopt eagerness strategies in line with the current environmental incentive will achieve highest performance levels. In other words, those agents who closely observe changes in incentive structure and choose strategies that are consistent with incentive structures are going to perform better than those who miss changes in incentive structure and are not flexible in making decisions about strategies. Unfortunately, the interactive effect of task incentive and state regulatory focus on performance did not reach significance. This may be due to methodological issues such as the validity of the state regulatory focus measures given that we know state regulatory focus had issues with convergent validity. The lack of a significant relationship could also be due to issues regarding what kinds of fit are most important in influencing performance. It could be the case, for example, that fit between task incentive and strategy is the main driver of

performance whereas fit between task incentive and state regulatory has little bearing on performance levels. Future research should identify the most important kinds of fit in predicting performance.

Contribution 4: 'what feels right' versus 'what is most effective'. The fourth contribution is the notion that sometimes fit between state regulatory focus and strategy—or 'what feels right'—conflicts with 'what is most effective'. The latter phenomenon—selecting eagerness levels based on 'what is most effective' (i.e., the task incentive)—is fully supported in this experiment. The former possibility—selecting strategies based on 'what feels right'—went unsupported. The failure to observe the notion of regulatory fit between eagerness and state regulatory focus limits the usefulness of this research for shedding light on the tradeoff in contribution 4. Four methodological issues could account for the absence of regulatory fit: (1) failure to detect vigilance strategies, (2) invalid measurement of regulatory focus, (3) operationalization of strategy, and (4) focus on bottom-up rather than top-down effects. An additional reason could be the fact that regulatory fit effects are often subtle and have small effect sizes. The experiment may have not been able to detect these subtle effects because it was carried out towards the end of the semester when participants may have had less conscientiousness and may have experienced more difficulty in paying attention to manipulations. This higher base rate of low conscientious individuals could have created noise, making it less likely to detect highly nuanced regulatory fit effects. Future research should attempt to remedy these methodological issues in order to better test for the potential tradeoff between 'what feels right' and 'what is most effective'.

Outside of results corresponding to contribution 2, the expected main and interactive effects involving eagerness strategy, dispositional regulatory focus, and metacognition failed to

reach significance. I was not able to identify a single methodological issue that could account for all of these null findings. However, measuring vigilance is essential for examining regulatory fit, and therefore, the failure to measure vigilance could have endangered my ability to uncover the tradeoff between regulatory fit and what is most effective. Methodological issues that also could have affected these non-significant findings include (1) measurement issues with trait regulatory focus, (2) operationalization of strategy, (3) learning effects over time (given these all involve within-person changes). Additionally, it could be that in experiments—where situational effects are supreme and effects of traits are less salient—the effect of trait regulatory focus was not strong enough to reach significance. Another possibility is that, unlike the powerful effect of fit between strategy and task incentive, the fit between dispositional regulatory focus and task incentive is not an important driver of outcomes. Future research should look into the many different kinds of fit and identify which fit effects are most potent.

In the previous section I interpreted the significant and non-significant results in the context of the four contributions. Using this interpretation of findings in the previous section, I provide implications in the following section. First, I will focus on theoretical implications and second, I discuss practical implications.

Theoretical Implications

This study is grounded in two theoretical paradigms to help explain the role of metacognition in shaping the effects of task incentive and state regulatory focus on performance. These frameworks are regulatory focus theory and social-cognitive theory. Contribution one concerned the origins of within-person fluctuations in strategy and state regulatory focus. In this study I identified one situational factor, task incentive, as a predictor of changes in strategy over time. As such, scholars should consider including task incentive in theories of regulatory focus in

order to help explain the origin of strategy. Additionally, task incentive may help regulatory focus theory to be more attuned to performance incentives as a driver of eagerness strategy given that extant conceptualizations focus on regulatory focus as a main driver of strategy. Incorporating task incentive into regulatory focus is consistent with the perspective that there are various reasons or motivations (driven by the environment) that people have for switching back and forth between eagerness and vigilance strategies (Scholer & Higgins, 2012).

Another potential implication stems from contribution three—or the search for personal and situational factors that interact with strategies and state regulatory focus to influence performance. Task incentive is one of these situational factors. Regulatory focus theories that do not include features like task incentive may be underestimating the true effects of eagerness strategies on performance. This proves to be another reason for incorporating task incentive into theories of regulatory focus because it may help scholars to harness more explanatory power of strategies in influencing task performance.

As a caveat, my thoughts about including task incentive in regulatory focus are highly speculative for two main reasons. One, this experiment failed to replicate certain fundamental aspects of regulatory focus theory such as the relation between state regulatory focus and eagerness. Given that it does not support fundamental parts of regulatory focus theory, the experiment as a whole is somewhat limited in providing theoretical implications for regulatory focus theory. Two, I operationalized strategies according to signal detection theory as consistent with theory (Higgins, 2000) and research (Camacho, Higgins, & Luger, 2003). However, another way to operationalize strategies is by viewing speed as indicative of an eagerness strategy and accuracy as indicative of vigilance (as discussed in the exploratory analysis section). It is possible that when using this new operationalization, the effects of task incentive in influencing

strategies and interacting with strategies to influence performance may be non-significant. Therefore, future research should examine which of the two operationalizations best capture the construct of interest and its influence on downstream outcomes.

Practical Implications

Practical implications are also apparent for the role of task incentive on within-person changes in strategies and its interaction with strategies in influencing performance. According to my interpretation of the results, employees who flexibly change their strategies according to changes in incentive structure are going to be most effective. This requires employees to not only observe initial incentives embedded in the task but to also track these incentives as they change over time. In other words, obtaining maximal performance is a dynamic pursuit that requires constant monitoring and adaptation. One way to help employees maximize their performance is by making the task incentives explicit. Participants within my experimental task learned about the task incentives through feedback. Similarly, managers could provide feedback to employees to help them understand how incentive structures change over time. One problem with providing this information is that not all changes in incentive structure can be predicted given the highly dynamic and uncertain nature of the organizational performance context. Therefore, managers should attempt to inspire employees to play close attention to task incentives and train employees to make flexible decisions about strategies that are informed by careful and continuous observation of incentive structures. For example, restaurant employees preparing for food inspections should learn to be extremely cautious and vigilant. As they transition from preparation of food inspections to producing enough food for all the customers, the slow and extremely vigilant approach should give way to a somewhat quicker response to food preparation. Post feedback interventions by the manager can help employees who missed the

change in task incentive to understand the signs that the incentive structure in the environment was changing and help them recognize those signs the next time.

Strengths, Limitations, and Future Research

My research design enabled me to offer a number of strengths. First, partly due to careful piloting, participants were able to infer the task incentive based on feedback. In support of this, task incentive was predictive of initial eagerness strategy and changes in task incentive predicted corresponding changes in eagerness strategies. The linkage between task incentive and strategy is important to begin to understand the situational origins of eagerness strategy. Second, as opposed to much self-regulation research that is static in nature, this experiment was designed to capture within-person fluctuations by using nine time points. All time-varying constructs of interest were measured at each of the time points, which allowed a more fine-grained and high-resolution understanding of the dynamics at play. Additionally, in response to careful pretesting, the discontinuity was set after the third time point, which allowed enough time to observe changes in the slope of strategy due to the shifting task incentive. These features of the design enabled me to examine slopes in state regulatory focus and strategy over time, which has rarely been examined. Third, I used discontinuous latent growth curves, which is rarely used but highly important for understanding dynamics. Discontinuous latent growth curves enabled me to test how the slope of certain time-varying covariates before the discontinuity predicted the slope of time-varying covariates following the discontinuity. This is important for testing many of the hypotheses.

There are a number of limitations of this research (please refer to exploratory analysis section for more detail). First, the operationalization of strategy did not fully capture vigilance. I used the number of targets shot (as compared to number of targets marked peaceful) in order to

capture eagerness versus vigilance strategy. This operationalization did not include information about errors or how careful participants were in making shoot or no shoot decisions; yet, this information is necessary for measuring vigilance strategies (Higgins, 2000). Given that strategies are important in making contributions 1, 2, and 4, the failure to adequately measure vigilance strategy likely was one major factor in the failure to make theoretical contributions. Second, although I used a well-established measure of trait regulatory focus, its pattern of relations with other variables is inconsistent with theory and research. The same is true for the state prevention measure. Third, I chose only one of the two operationalizations of strategy done in the literature; however there may be reason to include the alternative operationalization in future studies to understand how speed and accuracy change over time. Fourth, learning and fatigue effects may have played a role in the significant and non-significant results. However, they are unlikely to fully explain the pattern of significant results involving task incentive, strategy, and performance. This is because the direction of fluctuations in strategy over time depended on the condition and happened directly following the discontinuity. The learning effects, in contrast, were fairly constant throughout most of the experiment. The timing of the experiment towards the end of the semester may have also played a role. Although I tried to limit the effects of low conscientious students by including insufficient response items, the end of semester effect may still have created extra noise, which could have increased standard error. This is consistent with some of the high standard errors I observed when running discontinuous latent growth curves to test the dynamic model. Fifth, another potential limitation could be the setup of the experiment, which focuses on bottom-up (i.e., strategy to state regulatory focus) effects as the sole driver rather than top-down effects. Contrary to my focus on bottom-up effects, studies on regulatory focus tend to focus on top-down effects. Although I did not find the presence of top-down

effects, my experiment is ill-equipped to investigate these relations given that the task incentive (which predicts strategy) is manipulated, whereas state regulatory focus is not manipulated. Future research should use manipulations of state regulatory focus to investigate the dynamics of top-down effects.

A final limitation was that I ran many models in testing the hypotheses. Testing so many individual models may have increased type 1 error rates. However, the individual models were needed for two main reasons. First, testing the hypotheses required multiple analytic approaches. For example, some hypotheses dictated a certain analytic approach and other hypotheses required a different approach. It was not always possible to combine these different analytic approaches in order to test an overall model encompassing all the hypotheses. Second, discontinuous latent growth curves require more parameters than normal latent growth curves, and therefore, testing a more combined model as opposed to separate models can lead to convergence issues.

Conclusion

It is important to understand fluctuations in regulatory focus because, as I have argued in this thesis, they may prove critical to understanding the origin of state regulatory focus and eagerness (contribution 1), to rethink regulatory fit as a process that unfolds over time (contribution 2), to account for more variance in performance (contribution 3), and to understand potential tradeoffs between 'what feels right' and 'what is most effective' (contribution 4). Unfortunately, the results of this thesis were limited in shedding light on these contributions; however, this lack of support may be due to methodological issues. Moreover, the findings suggest that people are motivated to make switches from vigilance to eagerness strategies and

vice versa in accordance with task incentive. All in all, there is value in taking a more dynamic approach to studying the overarching motivational systems of promotion and prevention.

APPENDICES

APPENDIX A: PILOT 1

Purpose

The major aim of pilot 1 was to investigate the effect of the task incentive induction on eagerness versus vigilance strategy. Secondary aims included issues outside of task incentive such as the role of the metacognitive manipulation in shaping strategy by interacting with task incentive as well as the need to adjust questions in the metacognitive manipulation or corresponding self-report. I also sought to answer questions such as the following: How many trials were necessary for the manipulations to affect strategy, and more specifically, how many trials were needed before and after the shift in task incentive? Were three-minute trials sufficient for participants to encounter multiple ambiguous targets in order to measure eagerness versus vigilance strategies? Was eagerness strategy distinguishable from state regulatory focus?

Design

The design mirrored the design of the thesis, with some exceptions. The pilot was a 2 (Task incentive: Eagerness to vigilance, vigilance to eagerness) X 2 (metacognition versus no metacognition) fully crossed, between subjects design with 9 repeated measures. My goal was to have 10 participants for each of the four conditions. There were 11 participants in no metacognition and vigilance to eagerness condition, 13 participants in no metacognition and eagerness to vigilance condition, 18 participants in metacognition and vigilance to eagerness condition, 15 participants in metacognition and eagerness to vigilance condition.

Anticipated Findings

I begin with expectations related to the major purpose of the pilot, and afterwards, provide expectations relevant to secondary purposes such as metacognition.

Task incentive. Regarding *prediction 1*, I expected changes in task incentive to prompt changes in strategy. Specifically, I expected that, as the task incentive changed from eagerness to vigilance, participants would show a greater eagerness strategy before the switch than after the switch. Conversely, as the task incentive changed from vigilance to eagerness, participants would show a greater eagerness strategy after the switch than before the switch. Regarding *prediction 2*, following the change in task incentive, I expected that the task incentive induction would influence strategy. I expected eagerness task incentives would lead to a greater eagerness strategy than vigilance task incentives.

Metacognition. In regards to *prediction 3*, I expected that the metacognitive manipulation would influence state metacognition. In *prediction 4*, I expected that following the change in task incentive, the metacognition manipulation would strengthen the relationship between task incentive and eagerness versus vigilance strategy.

Findings

I relied heavily on repeated measures analysis of variance (RM ANOVA) for two main reasons. First, this analysis allowed me to test the main and interactive between subject effects of task incentive and metacognition while controlling for trait metacognition. Second, RM ANOVA's allowed me to test the interactive effect of time with the two main factors, metacognition and task incentive.

I used a paired t-test to support *prediction 1*—the expectation that a shift in task incentive would prompt a change in eagerness strategy. The paired t-test was needed to compare the eagerness strategy before the change in task incentive (time points 1-3) to the average eagerness strategy after the change (time points 5-9). Time point 4 happened after the shift, but before

participants received feedback indicating the shift in incentive. Thus, time point 4 was excluded from all analyses.

As shown in Tables 15 and 16, a shift in task incentive from eagerness to vigilance prompted a decrease in eagerness strategy. Similarly, shifts in task incentive from vigilance to eagerness prompted an increase in eagerness strategy.

Table 15: *Descriptive Statistics for Strategy Before and After Shift*

Task Incentive Condition	Eagerness	Mean	N	Std. Deviation
Vigilance to Eagerness	Eagerness averaged across time points 1-3	.22	26	.25
	Eagerness averaged across time points 5-9	.64	26	.33
Eagerness to Vigilance	Eagerness averaged across time points 1-3	.63	27	.34
	Eagerness averaged across time points 5-9	.27	27	.22

Note: Higher score for eagerness indicates higher eagerness. Lower scores for eagerness indicates higher vigilance. Also, time point 4 happens after the shift, but before participants received feedback indicating the shift in incentive. Thus, time point 4 was excluded.

Table 16: *Changes in Eagerness Strategy for Both Task Incentive Conditions*

Task Incentive Condition	Pair	Mean Difference	Std. Deviation	t	df	Sig.
Vigilance to Eagerness	Eagerness averaged across time points 1-3 minus Eagerness averaged across time points 5-9	-.41	.41	-5.00	25	.00
Eagerness to Vigilance	Eagerness averaged across time points 1-3 minus Eagerness averaged across time points 5-9	.37	.41	4.63	26	.00

Note: Higher score for eagerness indicates higher eagerness. Lower scores for eagerness indicates higher vigilance. Also, time point 4 happens after the shift, but before participants received feedback indicating the shift in incentive. Thus, time point 4 was excluded.

I used RM ANOVA's to evaluate *predictions 2-4*. To test these predictions, I controlled for trait metacognition and included scores for eagerness strategy at time points 5-9, the time points after the change in task incentive. The sphericity assumption was not met. Because the sample size is quite small, I performed RM ANOVA's, using the Epsilon correction. All within-subjects results are reported from the Huyn-Feldt row of the SPSS output.

Prediction 2 concerned the effect of task incentive on eagerness versus vigilance strategy following the shift in incentive. I found support for the effect of task incentive on strategy, averaging across the five time points following the shift in task incentive ($F(1,37) = 21.55$, $p < .001$). Although not predicted, I also found that the effect of task incentive on eagerness strategy strengthened over those five time points ($F(3.85, 142.61) = 7.30$, $p <. 001$).

Moving onto the metacognitive manipulation, *prediction 3* stated that the metacognitive manipulation would influence state metacognition. This prediction was not supported ($F(1, 47) = .09$, $p = .76$). However, the metacognitive manipulation did interact with time to have a marginally significant effect on the state metacognitive measure ($F(3.61, 47) = 2.05$, $p = .10$), meaning that the metacognitive manipulation may have a greater positive effect on state metacognition over time. Lastly, *prediction 4* concerned the interactive effect of metacognitive manipulation and task incentive on eagerness versus vigilance strategy following the shift in task incentive. This effect was significant ($F(1, 37) = 6.23$, $p = .02$) and is shown in Figure 6.

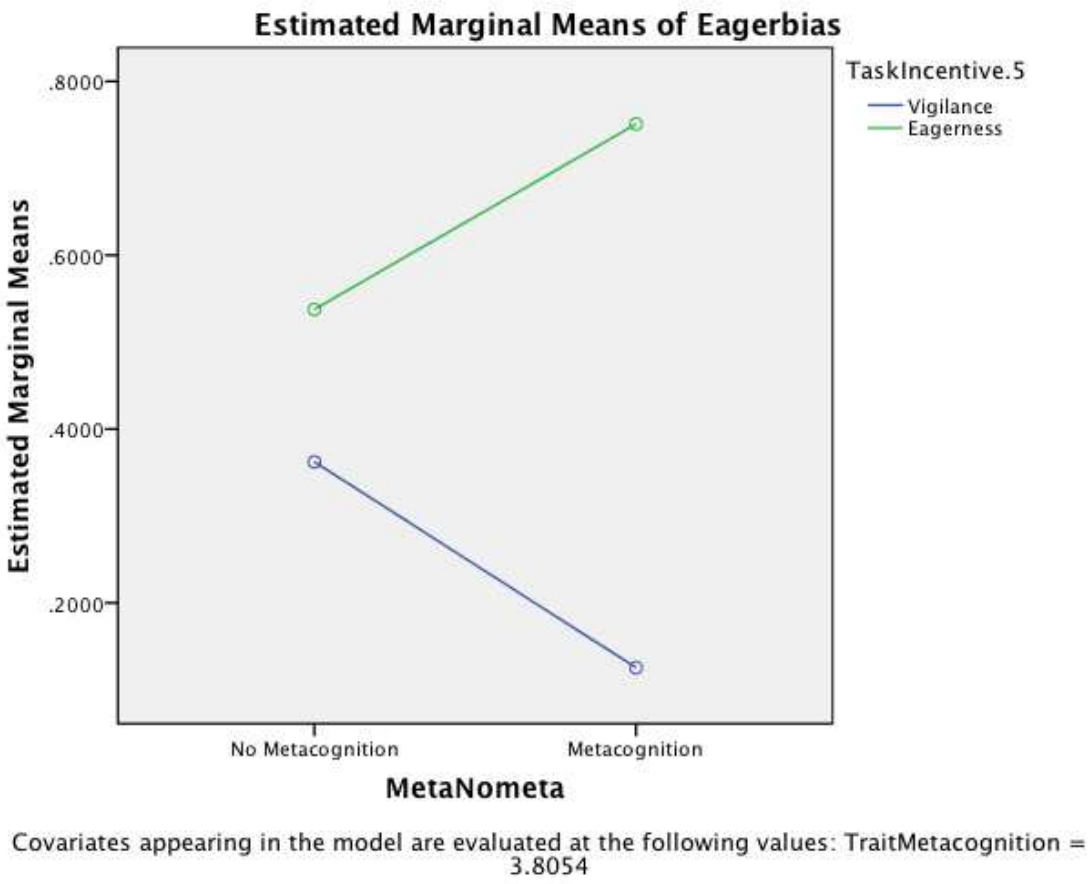

Figure 6. *The role of metacognition in the relationship between task incentive and eagerness strategy.*

Note: A score of 1 indicates perfect eagerness and score of 0 indicates perfect vigilance.

I used an RM ANCOVA, controlling for trait metacognition, to assess the interactive effect of metacognition and task incentive over time. I found a three-way interaction between task incentive, metacognition, and time ($F(3.85, 142.61) = 2.62$, $p = .04$). This indicated that metacognition had a greater effect over time on the relationship between task incentive and strategy. In other words, the effect of metacognition on the task incentive-strategy relationship grew over time. To better understand the interaction, I first present Table 17, where I show the results of a multivariate ANCOVA that describes the between subjects interaction at each time point. Second, I illustrate the three-way interaction using Figure 7 and Figure 8 (below). Notice

that the difference in eagerness strategy between those who received an eagerness task incentive and those who received a vigilance task incentive becomes much more pronounced in the presence of metacognition.

Table 17: *The Interactive Effect of Task Incentive and Metacognition at Specific Time Points*

Source	F(1,37)	Outcome	Significance
Task incentive * Metacognition	.001	Eagerness Time 5	.92
Task incentive * Metacognition	3.67	Eagerness Time 6	.06
Task incentive * Metacognition	5.95	Eagerness Time 7	.02
Task incentive * Metacognition	9.49	Eagerness Time 8	.00
Task incentive * Metacognition	7.71	Eagerness Time 9	.01

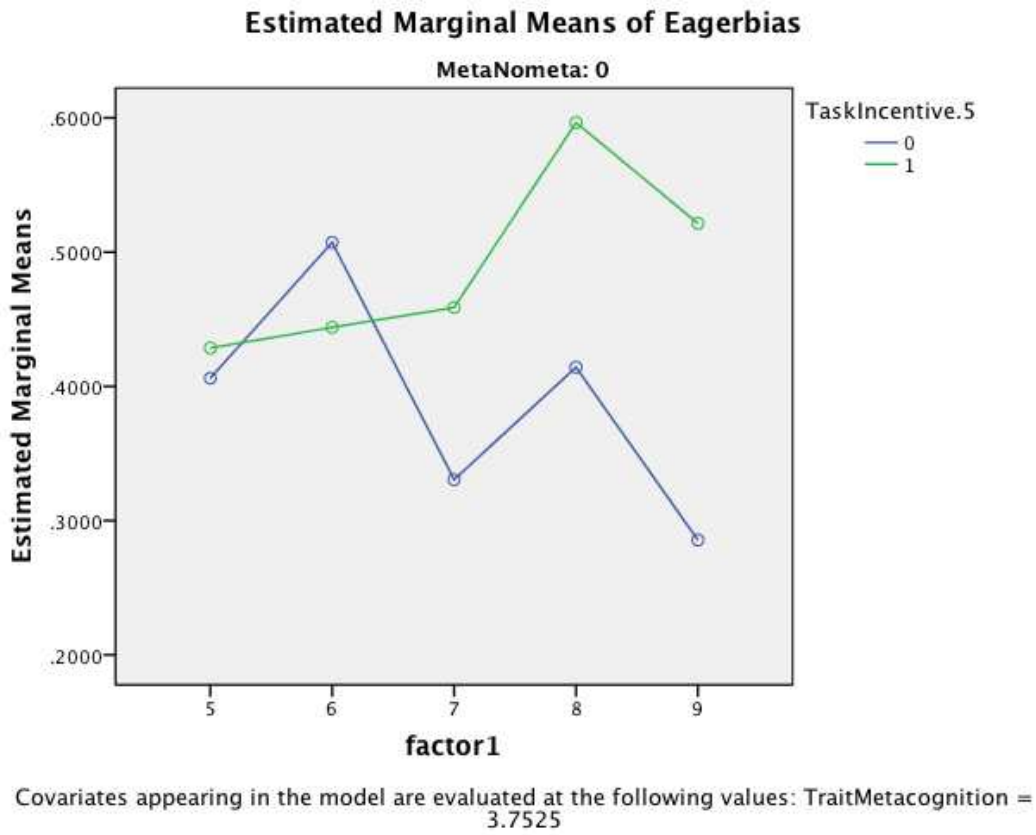

Figure 7. The effect of task incentive on eagerness strategy when metacognition is absent.

Note: A score of 1 indicates perfect eagerness and score of 0 indicates perfect vigilance.

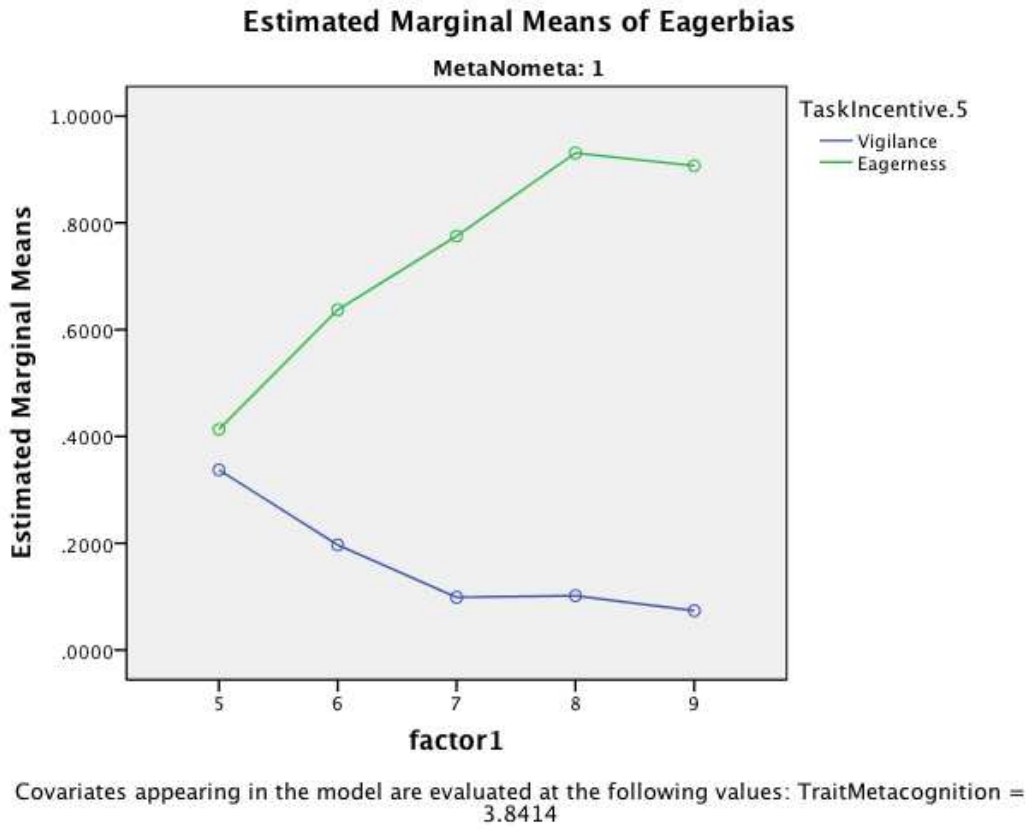

Figure 8. The effect of task incentive on eagerness strategy when metacognition is present. Note: A score of 1 indicates perfect eagerness and score of 0 indicates perfect vigilance.

State Metacognitive Measure

The state metacognitive measure was used in this experiment as a manipulation check on the metacognition condition. The lack of full support for the effect of metacognition manipulation on state metacognition points to the possibility that the state metacognition is not a valid measure. This is entirely possible as the measure was only loosely adapted from previous versions.

I ran reliability analysis in an attempt to improve the measure. During the first trial, the scale had an alpha of .88. One of the items on the scale did not load with the other items, and therefore I eliminated that item. Also, the content of certain items were not well aligned with the

metacognitive manipulation. For example, one item read "I tried to implement new strategies", which was entirely absent from the metacognitive manipulation. I changed this item to "I thought about what helped or hurt my performance" to be more in line with the metacognitive manipulation. The metacognition scale with all updates is shown in Appendix C.

Trial Length

Three-minute trials allowed participants to engage enough ambiguous targets to ensure variability in eagerness strategy. This is evidenced by the fact that task incentive and the interactive effect of metacognition and task incentive influenced eagerness strategy.

Number of Trials

The metacognitive manipulation failed to interact with task incentive until the fifth time point. Also, the interactive effect of metacognition manipulation and task incentive grew stronger over time. It was apparent that both manipulations were having an effect by the fifth trial. The interactive effect of state metacognition and task incentive was particularly strong in the 8th and 9th trials. Thus, nine trials seemed sufficient for both manipulations to have an effect. Further, there seems to be an advantage to having more trials after the shift than before the shift. Having six trials after the shift allowed the manipulations to have a full effect. However, having six trials before the shift and after the shift might fatigue participants. Thus, in the main data collection, I decided to have three trials before the shift and six trials after the shift.

Distinctiveness of State Regulatory Focus

State regulatory focus and eagerness strategy, averaged across nine time points, did not seem to correlate. The correlation between eagerness strategy and state promotion and between state prevention eagerness strategy were in the expected directions but not significant. However,

given that this measure of state regulatory focus has not been tested, the focus of the second pilot study was to ensure the reliability of a measure of state regulatory focus.

APPENDIX B: PILOT 2

Purpose and Design

The second pilot aimed to create and confirm the reliability of a concise measure of state regulatory focus with a 2-factor structure. I began by creating items that were consistent with the approach and avoidance aspects of promotion and prevention. These items also captured the higher-level goals of regulatory focus such as advancement and development versus responsibility and obligations. The items captured the participant's thoughts and feelings "right now" to be consistent with the momentary nature of state regulatory focus.

The final measure contained 18 items and was administered to 192 mechanical turk workers, who received fifty cents for the 2-4 minute survey. I discarded data from 12 participants due to lack of responding or careless responding. I measured careless responding by including an item that asked participants to mark a certain answer. The final sample size was 180. In addition the state regulatory focus measure, I also included a validated measure of trait regulatory focus (Lockwood, Jordan, & Kunda, 2002) and a state regulatory focus manipulation check used in Pham and Avnet (2004).

Initially, I performed a confirmatory factor analysis in MPLUS on all 18 items using a 2-factor structure. The model indicated poor fit. To create a more concise model with better fit, I discarded items based on the alpha if item deleted and the factor loadings of each item as shown in SPSS. I deleted two items and again performed a confirmatory factor analysis. I continued this process of deleting items and running confirmatory factor analyses until I obtained a model with 10 items that showed good fit (shown in Figure 9). Reducing the items any further resulted in worse fit indices. I made sure that at least one item reflecting higher-level goals (e.g., responsibility) was present in each factor as consistent with theory.

Results

Reliability for the 10-item, 2 factor measure of state regulatory focus was acceptable. Cronbach's alpha for the promotion scale was .91; Cronbach's alpha for the prevention scale was .87. Fit indices for the confirmatory factor analysis indicated good model fit, as shown in Table 18.

Table 18: *Fit Indices for 10-item, 2-factor Structure*

	Fit Index						
	Chi-Square	*RMSEA*	*CFI*	*TLI*	*SRMR*	*AIC*	*BIC*
Estimate	*69.01*	*.08*	*.97*	*.96*	*.03*	*7497.25*	*7596.41*
DF	*34*						
Sig.	*.00*						
Lower bound		*.05*					
Upper bound		*.10*					

Chi-square was significant, but given the large sample size, the other fit indices were more relevant and together showed good model fit. The variances, covariances, and errors are shown in Figure 9 below.

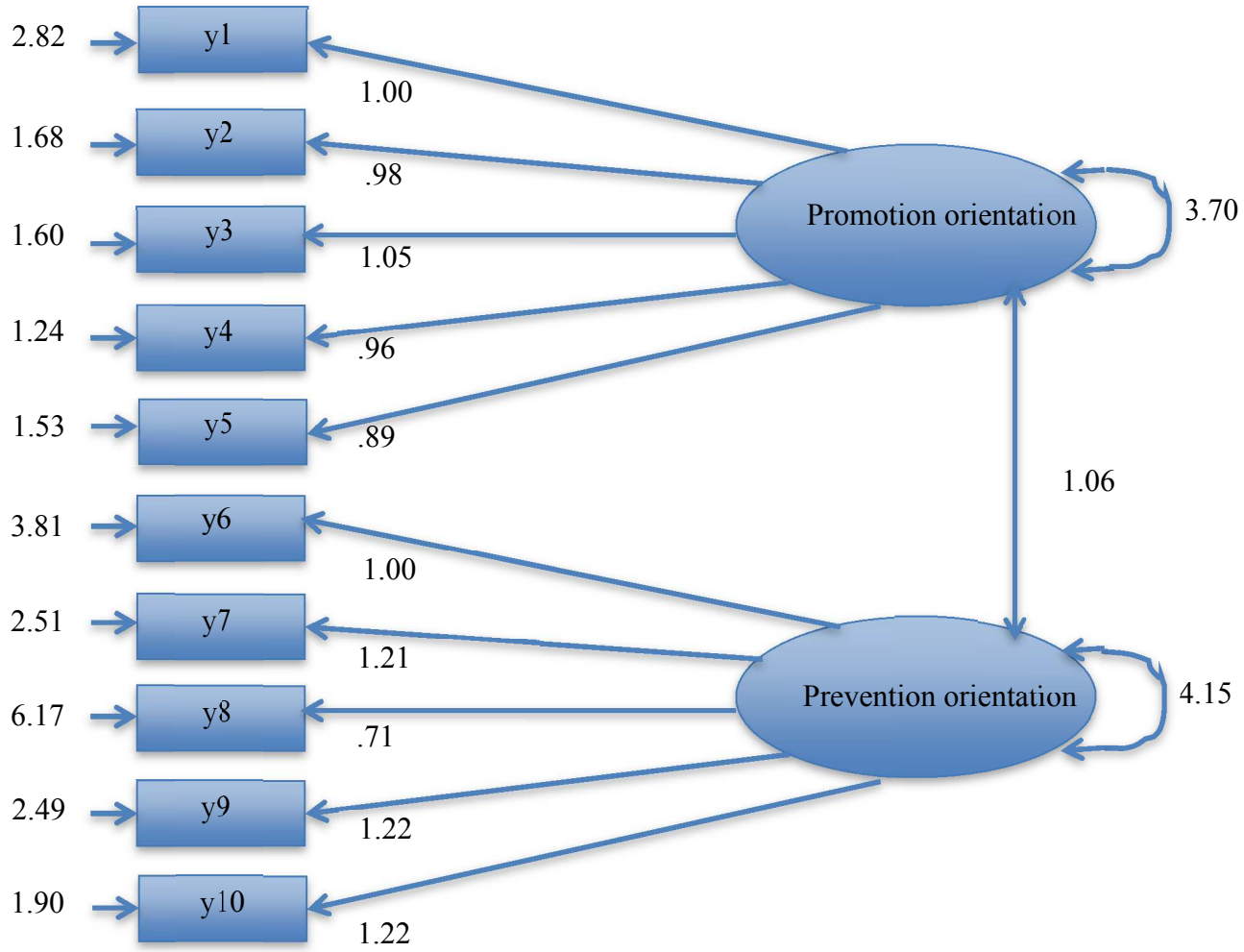

Figure 9. Variances and covariance between latent factors, estimates, and errors.

Preliminary Validity Argument

The final measure is shown in Appendix B. Promotion items such as "hopeful", and "ambitious" are consistent with the nature of promotion-focused individuals who hold an approach orientation and are concerned with advancement and development. Prevention items such as "focused on preventing failure" and "being weighed down by responsibilities" mirror prevention characteristics such as responsibility, obligations, and avoidance motivation.

Relationships between the focal measure of this pilot and the validated trait regulatory focus measure in Lockwood, Jordan, & Kunda (2002), as well as the manipulation check, provided some initial support for convergent validity. Results are shown in Table 19.

Table 19: *Bivariate Correlations Between State Regulatory Focus Scale and Other Measures*

Variable	State promotion	State prevention	Trait promotion	Trait prevention	State regulatory focus manipula check
State promotion	1				
State prevention	.24**	1			
Trait promotion	.68**	.17*	1		
Trait prevention	.13	.72**	.08	1	
Regulatory focus manipulation check	.37**	.13	.31**	.12	1

Note: *Indicates $p < .05$, **indicates $p < .01$

APPENDIX C: MEASUREMENT OF STATE REGULATORY FOCUS

State Regulatory focus

Please report the extent to which you feel certain feelings and think certain thoughts.
(Participants will rate the extent to which they feel these feelings and thoughts from a scale of 1 being "not at all" to 10 being "very much")

Promotion

Q1: Right now I feel: Enthusiastic

Q2: Right now I feel: Hopeful

Q3: Right now I feel: Ambitious

Q4: Right now I feel: Focused on achieving my aspirations

Q5: Right now I feel: Focused on positive events in the future

Prevention

Q6: Right now I feel: I want to avoid losses

Q7: Right now I feel: More focused on preventing losses than achieving gains

Q8: Right now I feel: Weighed down by responsibilities

Q9: Right now I feel: Focused on preventing negative events

Q10: Right now I feel: Focused on preventing failure

APPENDIX D: MEASUREMENT OF TRAIT REGULATORY FOCUS

Trait Regulatory Focus

Scale ranges from 1 (not true at all of me) to 9 (very true of me)

1. In general, I am focused on preventing negative events in my life.

2. I am anxious that I will fall short of my responsibilities and obligations.

3. I frequently imagine how I will achieve my hopes and aspirations.

4. I often think about the person I am afraid I might become in the future.

5. I often think about the person I would ideally like to be in the future.

6. I typically focus on the success I hope to achieve in the future.

7. I often worry that I will fail to accomplish my academic goals.

8. I often think about how I will achieve academic success.

9. I often imagine myself experiencing bad things that I fear might happen to me.

10. I frequently think about how I can prevent failures in my life.

11. I am more oriented toward preventing losses than I am toward achieving gains.

12. My major goal in school right now is to achieve my academic ambitions.

13. My major goal in school right now is to avoid becoming an academic failure.

14. I see myself as someone who is primarily striving to reach my "ideal self"—to fulfill my hopes, wishes, and aspirations.

15. I see myself as someone who is primarily striving to become the self I "ought" to be—to fulfill my duties, responsibilities, and obligations.

16. In general, I am focused on achieving positive outcomes in my life.

17. I often imagine myself experiencing good things that I hope will happen to me.

18. Overall, I am more oriented toward achieving success than preventing failure.

APPENDIX E: MEASUREMENT OF STATE METACOGNITION

State Metacognition

Please indicate the extent to which you agree with each of the following statements regarding your thoughts during and after receiving feedback about the last trial.

1. I asked myself how well I performed last trial.

2. I thought about what helped or hurt my performance.

3. I thought about how to improve past strategies.

4. I thought about how I can score better on the next trial.

5. I plan to use the feedback to improve my score on the next round.

APPENDIX F: MEASUREMENT OF TRAIT METACOGNITION

Dispositional Metacognition

1. I ask myself periodically if I am meeting my goals (M).

2. I try to use strategies that have worked in the past (PK).

3. I understand my intellectual strengths and weaknesses (DK).

4. I know how well I did once I finish a test (E).

5. I know what kind of information is most important to learn (DK).

6. I ask myself if I have considered all options when solving a problem (M).

7. I am good at organizing information (DK).

8. I am good at organizing information (DK).

9. I have a specific purpose for each strategy I use (PK).

10. I learn best when I know something about the topic (CK).

11. I know what the teacher expects me to learn (DK).

12. I am good at remembering information (DK).

13. I use different learning strategies depending on the situation (CK).

14. I ask myself if there was an easier way to do things after I finish a task (E).

15. I have control over how well I learn (DK).

16. I periodically review to help me understand important relationships (M).

17. I summarize what I've learned after I finish (E).

18. I can motivate myself to learn when I need to (CK).

19. I am aware of what strategies I use when I study (PK).

20. I find myself analyzing the usefulness of strategies while I study (M).

21. I use my intellectual strengths to compensate for my weaknesses (CK).

22. I am a good judge of how well I understand something (DK).

23. I find myself using helpful learning strategies automatically (PK).

24. I find myself pausing regularly to check my comprehension (M).

25. I know when each strategy I use will be most effective (CK).

26. I ask myself how well I accomplished my goals once I'm finished (E).

27. I ask myself if I have considered all options after I solve a problem (E).

28. I learn more when I am interested in the topic (DK).

29. I ask myself questions about how well I am doing while I am learning something new (M).

30. I ask myself if I learned as much as I could have once I finish a task (E).

Note: DK = declarative knowledge; PK = procedural knowledge; CK = conditional knowledge; M = monitoring; E = evaluation

APPENDIX G: DESCRIPTIVE STATISTICS FOR VARIABLES AT ALL TIME POINTS

Earlier in this paper, I provided the means and standard deviations for variables averaged across the time points before the shift in discontinuity as well as the same variables averaged across the time points after the shift in discontinuity. In Table 20 below I provide means and standard deviations for the variables at all nine time points.

Table 20: *Means and Standard Deviations for All Variables at Each Time Point*

	N	Minimum	Maximum	Mean	Std. Deviation
EV	293	0	1	.31	.47
VE	293	0	1	.36	.48
NeutC	293	0	1	.32	.47
MetaC	293	0	1	.50	.50
Pract	293	-2.00	8.00	1.55	1.95
Gender	291	1	2	1.39	.49
Race	289	1	5	1.48	.98
ACTSAT	280	700.00	1600.00	1146.21	139.70
GPA	289	1.00	4.00	3.09	.57
DProm	293	2.57	9.00	7.41	1.09
DPrev	293	1.78	9.00	6.01	1.36
DMeta	293	2.29	6.86	5.30	.69
Eagerness1	244	.00	1.00	.49	.32
Eagerness2	266	.00	1.00	.47	.37
Eagerness3	269	.00	1.00	.48	.37
Eagerness4	263	.00	1.00	.49	.31
Eagerness5	263	.00	1.00	.51	.36
Eagerness6	264	.00	1.00	.51	.37
Eagerness7	251	.00	1.00	.52	.40
Eagerness8	252	.00	1.00	.52	.41
Eagerness9	262	.00	1.00	.51	.42

Table 20 (cont'd)

Stateprom1	293	1.00	11.00	6.40	1.95
Stateprom2	293	1.00	11.00	6.57	2.08
Stateprom3	293	1.00	11.00	7.08	1.83
Stateprom4	293	1.00	11.00	7.18	1.85
Stateprom5	293	1.00	11.00	6.43	2.29
Stateprom6	293	1.00	11.00	6.30	2.36
Stateprom7	293	1.00	11.00	6.60	2.08
Stateprom8	293	1.00	11.00	6.08	2.45
Stateprom9	292	1.00	11.00	5.77	2.57
Stateprev1	293	1.00	10.20	6.63	1.86
Stateprev2	293	1.00	10.60	6.31	2.01
Stateprev3	293	1.00	11.00	7.24	1.71
Stateprev4	293	1.00	11.00	7.25	1.84
Stateprev5	293	1.00	11.00	6.41	2.18
Stateprev6	293	1.00	11.00	6.26	2.31
Stateprev7	293	1.00	11.00	6.60	2.13
Stateprev8	293	1.00	11.00	5.99	2.35
Stateprev9	292	1.00	11.00	5.72	2.52
Perf1	293	-4	11	2.88	2.87
Perf2	293	-3	14	5.18	3.16
Perf3	293	-4	14	6.52	3.28
Perf4	293	-5	13	4.08	3.11
Perf5	293	-7	14	5.24	4.03
Perf6	293	-6	15	6.55	3.38
Perf7	293	-11	17	7.11	3.76
Perf8	293	-5	16	7.69	3.78
Perf9	293	-7	14	6.76	4.32
StateMetacog1	293	1.00	5.00	3.42	.82
StateMetacog2	293	1.00	5.00	3.80	.75
StateMetacog3	293	1.00	5.00	3.22	.69
StateMetacog4	293	1.00	5.00	3.05	.70
StateMetacog5	293	1.00	5.00	3.61	.95
StateMetacog6	293	1.00	5.00	3.49	1.02
StateMetacog7	293	1.00	5.00	2.87	.79
StateMetacog8	293	1.00	5.00	3.34	1.05
StateMetacog9	292	1.00	5.00	3.20	1.11

Table 20 (cont'd)

EV = Eagerness task incentive condition compared to neutral and vigilance task incentive condition; VE = Vigilance task incentive condition compared to neutral and eagerness task incentive conditions; NeutC = Neutral task incentive condition compared to eagerness and vigilance task incentive conditions; MetaC = Metacognitive condition (compared to no metacognition condition); Pract = Performance on the practice trial; ACTSAT = Score on the ACT or SAT; Dprom = Trait promotion; Dprev = Trait prevention; Dmeta = Trait metacognition; Eagerness 1 = Eagerness score at time point 1; Stateprom1 = State promotion score at time point 1; stateprev1 = State prevention score at time point 1; Perf1 = performance at time point 1; StateMetacog1 = State metacognition score at time point 1.

APPENDIX H: BIVARIATE CORRELATIONS FOR VARIABLES AT EACH OF THE NINE TIME POINTS

In Table 21 (below) I provide bivariate correlations for the variables at all nine time points.

Table 21: *Descriptive Statistics for Variables at All Time Points*

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. EV	1.00											
2. VE	-.51**	1.00										
3. NeutC	-.47**	-.52**	1.00									
4. MetaC	-0.03	-0.03	0.06	1.00								
5. Pract	0.03	-0.01	-0.02	-0.01	1.00							
6. Gender	-0.04	.130*	-0.09	-0.07	-0.02	1.00						
7. Race	-0.04	0.04	-0.01	-.14*	-.16**	0.07	1.00					
8. ACTSAT	0.02	-0.02	0.00	0.01	.24**	.20**	-.25**	1.00				
9. GPA	-0.07	0.01	0.06	0.03	.20**	-0.06	-.18**	.33**	1.00			
10. DProm	-0.08	0.05	0.03	-0.01	.12*	-0.11	.13*	-.13*	0.11	1.00		
11. DPrev	-0.10	0.03	0.07	0.00	0.01	-0.09	-0.03	-0.07	-.18**	.15*	1.00	
12. DMeta	-0.03	-0.06	0.09	0.06	.22**	-0.07	0.04	-0.08	.12*	.44**	-0.03	1.00
13. Eager1	0.01	-0.01	0.01	-0.06	-0.06	0.09	0.06	0.01	-0.08	-0.05	0.09	-0.10
14. Eager2	.52**	-.39**	-0.11	-0.07	0.06	0.10	0.01	0.05	-0.06	-0.04	0.00	0.03
15. Eager3	.56**	-.40**	-.14*	-.13*	0.00	0.04	0.03	0.09	0.02	-0.05	0.01	-0.01
16. Eager4	.41**	-0.10	-.30**	-0.02	0.00	0.04	-0.03	0.01	-0.03	-0.08	0.00	0.02
17. Eager5	-.16**	.34**	-.19**	-0.04	0.04	0.08	-0.04	0.03	-0.05	-0.11	0.03	-0.08
18. Eager6	-.37**	.48**	-.12*	0.07	-0.08	0.11	0.04	-0.04	-.12*	-0.09	0.05	-0.07
19. Eager7	-.48**	.51**	-0.04	0.02	-0.05	0.09	-0.05	-0.01	-0.12	-0.08	0.06	-0.08
20. Eager8	-.54**	.60**	-0.07	0.00	-0.11	0.05	0.01	-0.05	-0.10	-0.06	0.05	-0.12
21. Eager9	-.64**	.65**	-0.01	0.04	-0.12	0.12	0.01	-0.02	-0.08	-0.01	0.09	0.01
22. Spm1	0.08	-0.09	0.01	0.01	0.03	0.01	-0.02	0.09	0.04	.18**	0.03	.28**

Table 21 (cont'd)

23. Spm2	0.07	-0.02	-0.06	0.02	-0.02	0.03	-0.05	0.09	0.05	.18**	0.01	.19**
24. Spm3	0.06	-0.08	0.02	0.00	0.05	-0.05	0.04	-0.08	-0.06	.22**	.27**	.23**
25. Spm4	0.02	0.01	-0.02	0.03	0.00	-0.01	0.03	-0.01	-0.02	.22**	.15**	.19**
26. Spm5	-0.09	.16**	-0.08	0.09	-0.03	0.07	0.07	0.03	0.06	.19**	0.02	.12*
27. Spm6	-0.08	0.04	0.04	.16**	-0.04	0.05	0.09	-0.01	-0.01	.17**	0.07	0.10
28. Spm7	0.02	0.00	-0.02	0.10	-0.02	0.03	0.11	-0.02	-0.01	.15*	0.09	0.05
29. Spm8	-0.05	0.09	-0.04	.17**	-0.05	0.11	0.11	0.03	0.01	.12*	-0.04	0.07
30. Spm9	0.01	0.08	-0.09	.14*	-0.11	0.07	0.04	-0.03	-0.03	.12*	-0.06	0.04

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); EV = Eagerness task incentive condition compared to neutral and vigilance task incentive condition; VE = Vigilance task incentive condition compared to neutral and eagerness task incentive conditions; NeutC = Neutral task incentive condition compared to eagerness and vigilance task incentive conditions; MetaC = Metacognitive condition (compared to no metacognition condition); Pract = Performance on the practice trial; ACTSAT = Score on the ACT or SAT; Dprom = Trait promotion; Dprev = Trait prevention; Dmeta = Trait metacognition; Eager1 = Eagerness score at time point 1; Spm1 = State promotion score at time point 1.

Table 21 (cont'd)

Measure	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
13. Eager1	1.00														
14. Eager2	.22**	1.00													
15. Eager3	.24**	.65**	1.00												
16. Eager4	0.05	.41**	.38**	1.00											
17. Eager5	0.11	0.03	-0.03	.20**	1.00										
18. Eager6	0.10	-.23**	-.18**	0.06	.60**	1.00									
19. Eager7	0.04	-.29**	-.29**	0.02	.56**	.71**	1.00								
20. Eager8	0.12	-.23**	-.32**	-0.04	.51**	.70**	.80**	1.00							
21. Eager9	.14*	-.23**	-.37**	-0.07	.52**	.70**	.78**	.82**	1.00						
22. Spm1	0.06	0.03	0.00	0.07	0.02	-0.04	0.01	-0.08	-0.04	1.00					
23. Spm2	0.01	-0.02	0.02	0.06	0.06	-0.02	0.04	-0.05	0.03	.83**	1.00				
24. Spm3	-0.04	0.05	-0.02	0.02	-0.05	-0.08	-0.03	-0.10	-0.04	.57**	.61**	1.00			
25. Spm4	-0.05	-0.07	-0.06	-0.01	0.01	-0.02	0.02	-0.03	0.01	.60**	.66**	.83**	1.00		
26. Spm5	0.01	-0.09	-0.08	-0.02	0.11	0.08	.16*	0.10	.16**	.55**	.70**	.52**	.65**	1.00	
27. Spm6	0.03	-0.02	-0.01	-0.06	0.01	-0.01	0.09	0.00	0.08	.52**	.65**	.52**	.62**	.84**	1.00

*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); Eager1 = Eagerness score at time point 1; Spm1 = State promotion score at time point 1

Table 21 (cont'd)

Measure	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
1. EV	0.02	-0.05	0.01	0.08	0.05	0.08	0.03	0.06	0.05	0.02	0.00	-0.01	.18**	.23**	0.08
2. VE	0.00	0.09	0.08	-0.05	-0.08	-0.08	0.03	-0.06	-0.04	-0.02	-0.02	-0.01	-0.03	0.08	.12*
3.NeutC	-0.02	-0.04	-0.09	-0.03	0.04	0.00	-0.06	0.01	0.00	0.00	0.02	0.01	-.14*	-.32**	-.21**
4. MetaC	0.10	.17**	.14*	-.12*	-0.08	-0.01	0.03	-0.01	0.05	.116*	0.10	0.11	-0.02	0.09	0.08
5. Pract	-0.02	-0.05	-0.11	0.07	0.06	0.06	0.05	0.03	0.04	0.00	0.02	0.02	.56**	.42**	.35**
6. Gender	0.03	0.11	0.07	-0.05	-0.09	-0.06	0.02	-0.01	-0.05	0.03	0.01	0.01	-0.08	-0.04	-0.06
7. Race	0.11	0.11	0.04	0.03	0.00	0.07	0.03	0.05	0.06	0.09	0.08	0.02	-.17**	-.19**	-.24**
8. ACSAT	-0.02	0.03	-0.03	0.00	-0.03	-0.01	0.01	-0.05	-0.07	-0.01	-0.07	-.12*	.14*	.18**	.17**
9. GPA	-0.01	0.01	-0.03	-0.05	-0.06	-0.03	-0.06	0.00	-0.08	-0.01	-0.07	-0.07	.16**	0.11	.15*
10. DProm	.146*	.12*	.12*	.12*	.132*	.28**	.24**	0.11	0.09	.14*	0.05	0.09	0.02	-0.04	-0.03
11. DPrev	0.09	-0.04	-0.06	.31**	.28**	.21**	.20**	.25**	.21**	0.09	.18**	.16**	-0.07	-0.08	-0.03
12. DMeta	0.05	0.07	0.04	0.10	0.04	.26**	.19**	0.08	0.07	0.06	0.05	0.09	.13*	-0.01	0.06
13. Eager1	-0.06	-0.04	-0.06	.13*	0.06	-0.06	-0.03	0.00	-0.06	-0.03	-0.09	-0.11	-0.07	-0.07	-0.03
14. Eager2	-0.01	-0.03	-0.03	0.05	-0.01	0.02	-0.05	0.00	-0.07	-0.02	-0.07	-0.10	0.09	-.14*	-0.09
15. Eager3	0.01	-0.03	0.00	0.03	0.00	-0.02	-0.03	0.00	-0.04	-0.02	-0.09	-0.09	0.03	-0.08	-.18**
16. Eager4	-0.02	0.03	0.01	.12*	0.06	0.12	0.06	-0.01	-0.02	-0.04	-0.03	0.03	.12*	0.07	0.09
17. Eager5	0.06	0.08	-0.01	0.02	0.01	0.00	0.05	0.03	0.02	0.04	0.04	0.04	.17**	.134*	.14*
18. Eager6	0.03	0.07	-0.05	-0.02	-0.06	-0.08	0.01	-0.03	-0.07	-0.01	-0.01	0.00	0.04	0.07	0.01
19. Eager7	0.08	0.11	0.02	-0.07	-0.01	-0.04	0.05	-0.01	-0.03	0.06	0.02	0.04	-0.02	-0.03	0.02
20. Eager8	-0.04	0.02	-0.03	-0.11	-0.07	-0.11	-0.02	-0.08	-0.09	-0.03	-0.05	-0.01	-0.10	-0.02	0.02
21. Eager9	0.02	0.10	0.04	-0.02	-0.01	-0.05	0.03	-0.06	-0.06	0.01	-0.02	0.02	-.15*	-0.07	0.03
22. Spm1	.46**	.48**	.45**	.40**	.42**	.63**	.57**	.42**	.32**	.44**	.34**	.34**	.12*	-0.02	0.10
23. Spm2	.55**	.61**	.54**	.37**	.46**	.66**	.62**	.39**	.32**	.53**	.32**	.32**	0.00	0.07	0.11
24. Spm3	.62**	.44**	.42**	.61**	.69**	.86**	.79**	.69**	.62**	.59**	.56**	.55**	0.04	-0.04	0.00
25. Spm4	.69**	.56**	.53**	.49**	.58**	.81**	.88**	.67**	.60**	.66**	.55**	.59**	-0.03	-0.07	-0.04
26. Spm5	.71**	.77**	.65**	.27**	.35**	.55**	.63**	.48**	.42**	.68**	.45**	.42**	-0.10	-.12*	-0.03
27. Spm6	.76**	.81**	.72**	.28**	.40**	.50**	.58**	.48**	.48**	.71**	.50**	.46**	-.12*	-.15*	-0.11

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); EV = Eagerness task incentive condition compared to neutral and vigilance task incentive condition; VE = Vigilance task incentive condition compared to neutral and eagerness task incentive conditions; NeutC = Neutral task incentive condition compared to eagerness and vigilance task incentive conditions; MetaC = Metacognitive condition (compared to no metacognition condition); Pract = Performance on the practice trial; ACTSAT = Score on the ACT or SAT; Dprom = Trait promotion; Dprev = Trait prevention; Dmeta = Trait metacognition; Eager1 = Eagerness score at time point 1; Spm1 = State promotion score at time point 1.

Table 21 (cont'd)

	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
1. EV	-0.06	0.06	.15**	.13*	.13*	.22**	-0.03	0.00	0.03	0.05	0.09	0.03	0.04	0.03	0.03
2. VE	0.02	.39**	.12*	.26**	.23**	.22**	-0.10	-.15**	-0.09	-0.10	-.16**	-.16**	-.13*	-0.10	-0.07
3.NeutC	0.04	-.46**	-.27**	-.40**	-.37**	-.45**	.13*	.16**	0.06	0.05	0.08	.130*	0.09	0.07	0.04
4. MetaC	.15*	.17**	.21**	.20**	.23**	.18**	0.03	0.01	-0.06	0.01	0.08	.18**	.12*	.24**	.20**
5. Pract	.29**	0.10	.19**	.25**	.20**	0.07	-0.06	-0.04	-0.03	0.00	-0.03	0.01	-0.02	-0.04	0.00
6. Gender	-0.06	-0.01	-0.04	0.01	0.01	-0.02	-0.10	-.15*	-0.07	-0.09	-0.10	-0.04	-0.07	-0.04	-0.02
7. Race	-.23**	-0.10	-.14*	-.13*	-0.09	-0.10	0.03	0.03	0.07	0.05	-0.02	0.03	-0.02	-0.02	0.03
8. ACSAT	.18**	0.01	.13*	0.10	.15*	0.05	-0.07	-0.10	-.12*	-0.04	-0.02	-0.09	-0.04	-0.07	-0.11
9. GPA	.14*	0.06	0.08	0.09	.12*	0.06	0.03	0.08	0.07	0.05	0.06	-0.01	0.03	0.00	0.03
10. DProm	-0.01	-0.05	-0.05	-0.07	-0.07	-0.03	.17**	.28**	.23**	.19**	.17**	0.10	.15**	0.07	0.08
11. DPrev	0.05	-0.02	-0.03	-0.07	-.13*	-.12*	.15*	0.09	0.03	0.00	-0.01	-0.02	-0.01	-0.07	-0.09
12. DMeta	0.11	0.01	0.01	-0.06	0.02	0.00	.16**	.20**	.19**	.18**	0.09	0.10	0.06	0.05	0.09
13. Eager1	-0.01	-0.04	0.05	0.00	0.01	-0.04	-0.07	-0.01	-0.04	-0.04	-0.03	0.01	-0.06	0.03	-0.02
14. Eager2	0.04	-.12*	0.01	0.04	0.02	-0.02	-.12*	-0.02	0.06	0.04	0.01	0.06	0.02	0.00	-0.03
15. Eager3	0.00	-0.10	0.07	-0.02	0.02	0.03	-.17**	-0.06	0.01	0.03	0.02	0.01	-0.05	-0.04	-0.09
16. Eager4	.12*	.17**	.17**	.13*	.12*	.14*	0.01	0.01	-0.01	-0.01	-0.01	0.00	-0.10	-0.03	-0.05
17. Eager5	0.07	.28**	.13*	20**	.18**	.15*	-.15*	-.17**	-.17**	-0.08	-0.09	-0.04	-0.11	-0.09	-0.07
18. Eager6	0.10	.24**	.13*	.16**	.19**	0.07	-.13*	-.16*	-.17**	-0.03	-0.11	-0.06	-0.08	-0.03	-0.05
19. Eager7	0.12	.26**	.15*	.14*	.17**	0.06	-0.01	-0.11	-0.12	-0.02	-0.04	0.04	-0.06	-0.03	-0.01
20. Eager8	0.06	.25**	0.11	0.12	0.07	0.01	-0.03	-0.08	-.13*	-0.07	-0.04	-0.05	-0.11	-0.05	-0.04
21. Eager9	0.06	.20**	0.04	0.07	0.10	-0.01	0.06	-0.02	-0.08	0.00	-0.07	-0.01	-0.04	-0.03	0.01

Table 21 (cont'd)

22. Spm1	.13*	0.05	0.06	-0.01	0.09	0.04	.41**	.34**	.34**	.30**	.19**	.23**	.21**	.20**	.19**
23. Spm2	.12*	.12*	0.08	0.05	.18**	.12*	.40**	.44**	.36**	.36**	.27**	.28**	.27**	.25**	.23**
24. Spm3	0.09	0.07	0.04	-0.02	0.07	0.06	.41**	.48**	.39**	.43**	.33**	.30**	.31**	.22**	.25**
25. Spm4	.15*	.12*	0.05	0.00	.13*	0.09	.40**	.45**	.37**	.48**	.40**	.36**	.34**	.32**	.32**
26. Spm5	0.09	.26**	.14*	.15*	.27**	.21**	.21**	.31**	.26**	.35**	.40**	.39**	.33**	.35**	.33**
27. Spm6	0.08	0.10	.14*	0.06	.18**	.15**	.27**	.34**	.28**	.38**	.42**	.50**	.40**	.42**	.34**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); EV = Eagerness task incentive condition compared to neutral and vigilance task incentive condition; VE = Vigilance task incentive condition compared to neutral and eagerness task incentive conditions; NeutC = Neutral task incentive condition compared to eagerness and vigilance task incentive conditions; MetaC = Metacognitive condition (compared to no metacognition condition); Pract = Performance on the practice trial; ACTSAT = Score on the ACT or SAT; Dprom = Trait promotion; Dprev = Trait prevention; Dmeta = Trait metacognition; Eager1 = Eagerness score at time point 1; Spm1 = State promotion score at time point. 1.

Table 21 (cont'd)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
28. Spm7	1.00														
29. Spm8	.78**	1.00													
30. Spm9	.68**	.80**	1.00												
31. Spv1	.38**	.23**	.19**	1.00											
32. Spv2	.52**	.32**	.29**	.83**	1.00										
33. Spv3	.58**	.47**	.41**	.56**	.61**	1.00									
34. Spv4	.65**	.56**	.48**	.53**	.59**	.85**	1.00								
35. Spv5	.68**	.45**	.38**	.62**	.68**	.62**	.69**	1.00							
36. Spv6	.66**	.42**	.37**	.61**	.71**	.57**	.64**	.86**	1.00						
37. Spv7	.93**	.75**	.64**	.41**	.53**	.61**	.69**	.72**	.70**	1.00					
38. Spv8	.74**	.56**	.51**	.52**	.58**	.50**	.58**	.81**	.83**	.76**	1.00				
39. Spv9	.65**	.52**	.64**	.48**	.55**	.51**	.59**	.72**	.73**	.67**	.81**	1.00			
40. Perf1	-0.08	-0.10	-.12*	0.01	0.00	0.06	0.02	-0.04	-0.06	-0.06	-0.05	-0.04	1.00		
41. Perf2	-0.09	-0.07	-0.04	-0.02	-0.03	-0.01	-0.02	-0.10	-0.06	-0.05	-0.05	-0.04	.52**	1.00	
42. Perf3	-.14*	-0.10	-0.10	0.05	0.01	0.08	0.00	-0.07	-0.06	-0.11	-0.09	-0.10	.44**	.59**	1.00
43. Perf4	0.02	.12*	0.10	0.05	0.05	0.11	.14*	0.03	0.02	0.04	0.04	0.08	.22**	.20**	.20**
44. Perf5	0.11	.13*	0.09	0.06	0.04	0.10	.15**	0.09	0.09	0.09	0.08	0.08	0.09	.28**	.35**
45. Perf6	0.08	0.11	0.06	0.02	0.03	0.03	0.07	0.08	0.05	0.06	0.04	0.04	.15*	.27**	.34**
46. Perf7	.12*	.13*	0.06	-0.01	0.00	0.00	0.05	0.04	0.04	0.11	0.03	0.00	.22**	.33**	.43**

Table 21 (cont'd)

47. Perf8	.20**	.289**	.16**	0.07	0.09	0.10	.18**	0.11	.13*	.20**	0.11	0.09	15**	.27**	.37**
48. Perf9	.22**	.25**	.24**	0.06	0.08	0.07	.15**	.12*	.14*	.22**	.14*	0.10	.15*	.29**	.32**
49. Smeta1	.21**	.19**	.27**	.30**	.38**	.34**	.35**	.22**	.23*	.18**	.18**	.22**	-0.10	-0.05	0.03
50. Smeta2	.31**	.28**	.31**	.28**	.38**	.44**	.41**	.22**	.18*	.27**	.16**	.21**	-0.08	-0.02	0.02
51. Smeta3	.27**	.22**	.25**	.20**	.26**	.36**	.31**	.19**	.13*	.24**	0.11	.16**	-0.02	-0.07	0.01
52. Smeta4	.39**	.35**	.39**	.21**	.30**	.40**	.44**	.29**	.22**	.33**	.23**	.27**	0.02	-0.04	-0.01
53. Smeta5	.46**	.37**	.43**	.18**	.26**	.33**	.38**	.34**	.32**	.43**	.28**	.36**	-.14*	-0.07	-0.03
54. Smeta6	.49**	.43**	.48**	.13*	.22**	.26**	.31**	.27**	.29**	.41**	.33**	.37**	-0.10	-0.07	-0.03
55. Smeta7	.52**	.43**	.49**	.18**	.23**	.24**	.29**	.26**	.25**	.47**	.33**	.36**	-0.08	-0.05	-0.02
56. Smeta8	.44**	.49**	.53**	.15*	.16**	.22**	.29**	.25**	.26**	.41**	.36**	.43**	-.12*	0.00	-0.04
57. Smeta9	.43**	.42**	.55**	.13*	.15**	.21**	.28**	.25**	.24**	.41**	.34**	.45**	-0.10	0.04	-0.02

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Spm1 = State promotion score at time point 1; Spv1 = State prevention score at time point 1; Perf1 = performance at time point 1; SMeta1 = State metacognition score at time point 1.

Table 21 (cont'd)

	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
43. Perf4	1.00														
44. Perf5	.28**	1.00													
45. Perf6	.32**	.60**	1.00												
46. Perf7	.28**	.64**	.64**	1.00											
47. Perf8	.29**	.62**	.65**	.74**	1.00										
48. Perf9	.19**	.59**	.59**	.71**	.75**	1.00									
49. Smeta1	0.07	0.02	0.03	-0.08	0.00	-0.01	1.00								
50. Smeta2	0.06	0.03	0.05	0.00	0.10	0.04	.60**	1.00							
51. Smeta3	-0.07	-0.02	-0.01	0.01	0.03	0.06	.43**	.68**	1.00						
52. Smeta4	0.09	0.08	.12*	0.07	.20**	.21**	.42**	.66**	.66**	1.00					
53. Smeta5	-0.01	0.10	.16**	0.11	.18**	.19**	.33**	.58**	.56**	.72**	1.00				
54. Smeta6	0.06	0.10	.21**	0.11	.19**	.18**	.32**	.48**	.48**	.67**	.78**	1.00			
55. Smeta7	-0.02	0.03	0.08	0.11	.13*	.18**	.28**	.50**	.50**	.62**	.73**	.756**	1.00		
56. Smeta8	0.10	.13*	.18**	.14*	.23**	.21**	.27**	.43**	.37**	.55**	.70**	.75**	.76**	1.00	
57. Smeta9	0.04	0.08	0.11	0.07	.14*	.19**	.30**	.40**	.38**	.52**	.67**	.67**	.70**	.84**	1.00

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Perf1 = performance at time point 1; SMeta1 = State metacognition score at time point 1.

APPENDIX I: ANALYSIS OF METHODOLOGICAL ISSUES

The purpose of the exploratory analyses was to evaluate the presence of potential methodological issues. Below I describe each issue, my analyses for detecting the issue, and results regarding the presence or absence of the issue. These analyses are important because they further explain the methodological issues that I described in the discussion section. These methods issues include the following: (1) timing of the experiment towards end of semester, (2) learning and fatigue effects, (3) measurement issues, (4) issues in operationalization of eagerness, and (5) lack of state regulatory focus manipulation.

End of Semester, Learning and Fatigue Effects. Timing of the experiment towards the final three weeks of the semester may have played a role in null findings because students who sign up for an experiment last minute are often less conscientious (Jacobs & Dodd, 2003). Although I tried to limit the effects of low conscientious students by including insufficient response items, the end of semester effect may still have created extra noise, which could have increased standard error and made it difficult to find significant results. It is difficult to understand the presence of this issue and its influence on null findings because the experiment only happened at the end of the semester and therefore cannot be compared with an experiment earlier in the semester. However, the experiment lasted roughly two weeks and it may be possible to detect decreases in the quality of participants over the course of those two weeks in order to test for the presence of the end of semester effect.

To detect this effect, I ran several analyses. First, I regressed number of correct answers to nine insufficient effort items onto the date for the study. Here, I expected an overall decrease in correct answers to insufficient effort items over the course of the two-week experiment. Contrary to expectations, I found no relation between date and responses to insufficient effort

items. Second, if the end of semester effect is present, those participants who joined the experiment later, because they are low conscientious, should pay less attention to manipulations than those who joined earlier. As such, the manipulations should weaken slightly over the course of the two-week experiment. With this in mind, I created interaction terms between the date and manipulations (i.e., task incentive and metacognition). Interactions between the date and manipulations in influencing manipulation checks, strategies, or performance did not reach significance. In other words, the date failed to influence the strength of *significant* main effects between manipulations and outcomes. Overall, I failed to detect a decline in ability to pay attention to measures and manipulations as the experiment progressed. However, the lack of findings does not necessarily mean the end of semester effect is absent because the period of two-weeks is short. Participants may well have been less conscientious in my experiment than if I had run the study earlier in the semester.

Learning and fatigue effects could provide alternative explanations for null findings. To evaluate learning and fatigue effects, I ran paired t-tests to compare the performance of participants on each of the 9 trials within the control condition. These paired t-tests captured any increase or decrease in performance occurring between each adjacent trial (e.g., trail 1 to trial 2; trial 2 to trial 3). Results are shown in Appendix J. The paired t-tests indicate support for the presence of learning effects (i.e., increase in performance) for all adjacent trials from 1 to 8 and a potential fatigue effect (i.e., decrease in performance) from trials 8 to 9 within the control condition.

Explaining null relations between regulatory focus and eagerness. Moving on from the issues above, an additional concern is the null relation between regulatory focus and eagerness. This is problematic because regulatory focus theory rests on the assumption of a

relation between regulatory focus and eagerness. To account for this non-significant relationship, I evaluate the presence of three methodological issues: (1) the operationalization of eagerness, (2) the measurement of state and trait regulatory focus, and (3) the focus on bottom-up effects (i.e., eagerness to regulatory focus) as opposed to top-down effects (i.e., regulatory focus to eagerness).

My decision for operationalizing eagerness could have accounted for the non-significant relationship. Eagerness is operationalized in two ways[18]. Using signal detection theory, some scholars suggest that eagerness reflects attention to "hits" whereas vigilance reflects attention to "correct rejections" (Camacho, Higgins, & Luger, 2003). Other scholars use speed (i.e., eagerness) versus accuracy (i.e., vigilance) to operationalize strategy (Camacho, Higgins, & Luger, 2003). I use the former operationalization that involves signal detection. However, the second operationalization can be extracted from the data by representing speed as number of targets engaged and accuracy as number or errors. I regressed the number of targets engaged at each time point and the total number of errors at each time point onto both state regulatory focus at each time point and trait regulatory focus at baseline. The only significant finding was between state promotion and number of targets engaged; state promotion and engagement were positively related (shown in Appendix K). None of the other expected relations were apparent. This suggests that this new operationalization could not account for variability in regulatory focus. However, I did not manipulate speed versus and accuracy and doing so may have made it more likely to predict state regulatory focus.

Another issue relevant for understanding null relations between eagerness and state regulatory focus is the validity of the measures. To measure trait regulatory focus, I used

[18] Sometimes scholars use both operationalizations—signal detection and speed versus accuracy—in defining and operationalizing eagerness.

measurement that is shown to be reliable and valid (e.g., Lockwood, Jordan, & Kunda, 2002). I adapted these items from this trait regulatory focus measure—as well as generated items based on theory—to create the state regulatory focus measures. However, results involving these measures did not match predictions, suggesting potential validity issues and prompting me to analyze for validity. I evaluated this problem by first restricting my analyses to the neutral condition to eliminate any influence from manipulations. Second, I used engaged targets and number of errors and performance to examine convergent validity of regulatory focus measures. Of course, the scope of variables in the thesis constrained which variables I could use in the validation attempt; nonetheless I used engaged targets, number of errors, and performance. These variables are appropriate for assessing convergent validity of regulatory focus for the following reasons. First, they are objective indicators; using subjective measures may increase common method bias and inflate relations that could be mistaken for evidence of convergent validity. Second, number of engaged targets and number of errors were used earlier as an alternative representation of eagerness. Nevertheless, they are relevant for evaluating the validity of regulatory focus because, regardless of whether or not they represent eagerness, number of engaged targets and accuracy should strongly relate to both state promotion and state prevention for the following reasons. A promotion focus, given its focus on development, advancement, and aggressively pursuing positive outcomes, should positively relate to performance and targets engaged and positively relate to number of errors. Conversely, a prevention focus, because of its focus on safety, security, and attention to errors, should negatively relate to number of targets engaged, performance, and number of errors.

Contrary to expectations, trait promotion did not predict number of targets engaged, performance, or number of errors. State promotion likewise failed to predict performance and

number of errors although it did significantly and positively predict number of targets engaged. State prevention also did not predict number of targets engaged, total number of errors, or performance. Taken together, the relation between all four measures of regulatory focus and related concepts were mostly non-significant and sometimes in the wrong direction (e.g., trait promotion and engagement exhibited a negative but non-significant relation).

I also examined correlations between state regulatory focus and trait regulatory focus with the expectations that they would be positively related, particularly at time 1. Somewhat in line with expectations, the relation between trait prevention and state prevention was significant and positively correlated at time 1 ($r = .31$, $p < .05$); but the correlation at all other time points did not reach significance. Contrary to expectations, the relation between trait promotion and state promotion was non-significant at all time points. It is difficult to identify the reason for lack of correlation because neither state prevention nor trait prevention held predictable relations with the objective indicators described in the prior paragraph. Taken together, all four regulatory focus measures may have suffered from validity issues.

The third potential cause of non-significant findings between eagerness and regulatory focus could be my focus on bottom-up effects as opposed to top-down effects. Specifically, I was interested in the bottom-up effects from eagerness to regulatory focus and therefore I included a manipulation of a situational factor—task incentive—that would directly influence eagerness. We did not manipulate state regulatory focus; therefore, the experiment is ill-suited to detect top-down effects from state regulatory focus to eagerness. Nevertheless, using simple correlations, I examined relations between state regulatory focus and eagerness in which state regulatory focus is measured prior to eagerness. With regard to state promotion and eagerness, the only significant correlations I found were between state promotion at time 5 and eagerness at time 7 ($r = .16$, $p<$

.05) and between state promotion at time 5 and eagerness at time 9 ($r = .16$, $p < .01$). With regard to state prevention and strategy, the only significant correlation I found was between state prevention and eagerness at time 4 ($r = .12$, $p < .05$), yet the direction of the correlation runs counter to expectations. All in all, there is virtually no support for the existence of top-down effects, but the caveat here is that the experiment is ill-suited to detecting these effects, which may explain their lack of significance.

In sum, there was support for the presence of learning and fatigue effects and issues in measuring regulatory focus. There was lack of support, however, for the presence of the end of semester effect or the possibility that an alternative operationalization of eagerness or focus on top-down effects could generate an expected pattern of results. The end of semester effect, operationalization of eagerness, however, may still have influenced results given that the exploratory analyses I ran are constricted to the data in my experiment. Some of the abovementioned methodological issues (e.g., operationalization of strategy, top-down versus bottom-up), therefore, are still unresolved issues that warrant future research. The issues highlighted in this section will guide interpretation of results in the following section.

APPENDIX J: LEARNING AND FATIGUE EFFECTS

Table 22 below illustrates the possible effects of learning and fatigue over time.

Table 22: *Learning and Fatigue Effects: Paired T-Tests*

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Perf1 - Perf2	-1.35	3.06	0.47	-2.29	-0.41	-2.89	42.00	0.01
Pair 2	Perf2 - Perf3	-1.49	2.72	0.42	-2.33	-0.65	-3.59	42.00	0.00
Pair 3	Perf3 - Perf4	1.33	2.97	0.45	0.41	2.24	2.92	42.00	0.01
Pair 4	Perf4 - Perf5	1.84	3.36	0.51	0.80	2.87	3.59	42.00	0.00
Pair 5	Perf5 - Perf6	-2.44	2.62	0.40	-3.25	-1.64	-6.11	42.00	0.00
Pair 6	Perf6 - Perf7	-0.16	2.63	0.40	-0.97	0.65	-0.41	42.00	0.69
Pair 7	Perf7 - Perf8	-0.30	2.69	0.41	-1.13	0.52	-0.74	42.00	0.47
Pair 8	Perf8 - Perf9	1.26	3.25	0.50	0.26	2.26	2.53	42.00	0.02

Perf1 = Performance at time point 1; Perf2 = Performance at time point 2.

APPENDIX K: STATE PROMOTION AND NUMBER OF TARGETS ENGAGED

Table 23 below describes the relations between state promotion and number of targets engaged across all time points.

Table 23: *Relations Between State Promotion and Number of Targets Engaged*

		Eng.1:	Eng.2:	Eng.3:	Eng.4:	Eng.5:	Eng.6:	Eng.7:	Eng.8:	Eng.9:
Stateprom1	Pearson Correlation	.44**	.40**	.44**	.39**	.45**	.43**	.35*	.514**	.35*
Stateprom2	Pearson Correlation	.33*	.33*	.36*	0.29	.35*	.37*	0.28	.49**	.37*
Stateprom3	Pearson Correlation	.41**	0.27	0.27	0.26	.33*	.37*	0.19	.30*	0.20
Stateprom4	Pearson Correlation	0.29	0.21	0.23	0.24	.38*	.42**	0.22	.30*	0.22
Stateprom5	Pearson Correlation	0.16	0.07	0.20	0.08	0.24	0.30	0.29	.42**	.38*
Stateprom6	Pearson Correlation	0.13	0.04	0.16	0.07	0.23	.304*	0.24	.47**	.44**
Stateprom7	Pearson Correlation	0.21	0.04	0.06	-0.04	0.16	0.28	0.23	.37*	.34*
Stateprom8	Pearson Correlation	0.23	0.16	0.24	0.12	0.25	.34*	.31*	.50**	.48**
Stateprom9	Pearson Correlation	0.08	0.11	0.24	0.23	.32*	.31*	0.25	.33*	.33*

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Stateprom1 = State promotion focus at time point 1; Eng.1 = Number of targets that the participant engaged at time point 1.

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