

## The Role of Metamotivation in Creating Task-Motivation Fit

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One of the challenges of effective goal pursuit is being able to flexibly adapt to changing situations and demands. The current studies investigate whether individuals exhibit effective *metamotivation*—successful management of one’s motivational states—in creating fit between an optimal motivational orientation and specific task demands (e.g., inducing a promotion focus, as opposed to prevention focus, in preparation for an eager brainstorming task). Using regulatory focus theory as a framework, 5 studies provide evidence that although North American individuals exhibit some metamotivational awareness of task-motivation fit in the realm of regulatory focus, they may also have competing beliefs that promotion motivation is generally better, regardless of task type. Given this tension, having metamotivational awareness of task-motivation fit did not always lead to successful behavioral enactment (Studies 3–5). We discuss connections to metacognition and implications for the role of flexibility in self-regulation.

*Keywords:* flexibility, metacognition, motivation, regulatory fit, regulatory focus

*Supplemental materials:* <http://dx.doi.org/10.1037/mot0000043.supp>

For years, psychologists have recognized that psychological flexibility is critical for self-regulatory success and well-being (e.g., Bonanno & Burton, 2013; Chen, 2012; Chiu, Hong, Mischel, & Shoda, 1995; Kashdan & Rottenberg, 2010). The people who are most successful are those who can flexibly adapt to changing demands, discerning *when* and *how* to shift goals and behaviors for optimal effectiveness. Despite agreement that such flexibility is beneficial, however, there has been relatively little empirical research examining the extent to which individuals exhibit such knowledge and skills (Bonanno & Burton, 2013). Building on

existing research, we propose that one critical component of this flexibility is *metamotivation*, identifying and managing motivational states in the pursuit of one’s goals.<sup>1</sup>

Metamotivation is a critical aspect of self-regulation because tasks often have specific (and different) motivational demands. Motivations that allow us to soar in one domain can cause us to plummet in another. And although the fable would tell us otherwise, the race does not always go to the tortoise; sometimes it goes to the hare. Those who fare best in this world are flexible in how they approach the race; they

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<sup>1</sup>We are not the first to use the term *metamotivation*. Maslow (1971) used the term to describe the motivation toward self-actualization, a definition very distinct from ours. Drawing on work by Kuhl and Kraska (1989), both Boekaerts (1995, 1996) and Corno (1993) employed the term *metamotivation* in their discussions of self-regulated learning and volitional control. Boekaerts in particular argued that *metamotivation* involves the processes by which learners initiate and sustain learning. Although there are conceptual parallels between her conception and ours (e.g., the recognition that successful performance involves the regulation of both cognitive knowledge and motivation), we use the term broadly to refer to how individuals manage motivational states not only for the specific purpose of learning, but for any goal-directed activity.

know when to be a tortoise and when to be a hare (e.g., Chiu et al., 1995). In the current studies we examine whether individuals exhibit metamotivational awareness of how different motivational orientations and strategies fit particular tasks, whether this knowledge gets translated into effective behavior, and what might hinder or facilitate effective metamotivational awareness.

### What Is Metamotivation?

In defining “metamotivation” we draw heavily from the literature on metacognition and learning that spans cognitive, developmental, and educational psychology. Metacognition, which consists of cognitions about one’s own mental states and processes, is often discussed more specifically in terms of metacognitive monitoring and control (see Dunlosky & Metcalfe, 2009). Monitoring typically involves assessing one’s cognitive activity in terms of progress toward a learning goal (e.g., “how well do I understand the text that I am reading?”), whereas control involves taking strategic actions to further this progress (e.g., “I should go back and reread the previous paragraph”).

Research suggests that students do well on academic tasks when they accurately assess their learning and then use these assessments to make strategic decisions about what to study and how to study it (e.g., Thiede, Anderson, & Theriault, 2003). To make accurate assessments and strategic decisions, students must possess at least three types of metacognitive knowledge: knowledge about themselves as learners, about the cognitive demands of the task, and about strategies that can be used to meet these demands (Flavell, 1979; Pintrich, 2002). For instance, a student who is completing a reading task needs to know that she can understand the text at a deep or superficial level (self knowledge). To assess whether she has a sufficient understanding of the text, she also needs to determine what level of comprehension is expected by the teacher (task knowledge). And, if the student concludes that her comprehension is insufficient, then she needs to know what strategies she can use to improve her comprehension (strategy knowledge).

Just as metacognition has been shown to play a critical role in the effective regulation of one’s cognitive states, we propose that metamotiva-

tion plays a critical role in the effective regulation of one’s motivational states for goal pursuit in general. Although the term metacognition typically refers to “knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of cognitive enterprises” (Flavell, 1979, p. 907) we define metamotivation as the knowledge, beliefs, and understanding of factors that influence motivational enterprises (i.e., various forms of goal pursuit). Our conception of metamotivation includes components that parallel both metacognitive monitoring and control. That is, we believe that metamotivation involves (a) assessing whether one is sufficiently or appropriately motivated to complete a particular task or pursue a specific goal, and (b) taking strategic actions to adjust or change one’s motivation (Wolters, 2003, 2011; Wolters, Benzou, & Arroyo-Giner, 2011). As with metacognition, both of these components involve three types of knowledge. For an individual to accurately monitor her current motivational state, she must be able to distinguish between different motivational states (self knowledge), have a sense of which motivational state will lead to optimal performance on a given task (task knowledge), and know which strategies she can use to induce this state in herself (strategy knowledge). Importantly, although we make no direct claims about the extent to which this knowledge must be explicit to guide self-regulation, we assume that metamotivational assessments can be made implicitly, or even automatically, just like metacognitive assessments (Reder & Schunn, 1996).

The notion that individuals must not only regulate cognition, but also motivation, has previously been discussed in the context of learning (Boekaerts, 1995, 1996; Schunk & Zimmerman, 1994; Wolters, 2003, 2011; Wolters et al., 2011), though empirical evidence for such metamotivational learning processes is still relatively underdeveloped (Wolters, 2011). These discussions tend to emphasize the extent to which learners can muster the right *quantity* of motivation to initiate and sustain learning and the extent to which students know the appropriate strategies for overcoming learning obstacles (e.g., boredom, anxiety). Our broad conception of metamotivation certainly includes these components, but emphasizes in particular that individuals must also be able to engage the right *quality* of motivation to fit task demands (not

only for learning, but for any type of goal pursuit), even in the absence of clear obstacles.

Our conception of metamotivation also complements existing ideas about the important role of psychological astuteness and flexibility in successful self-regulation and well-being (e.g., [Achtziger, Martiny, Oettingen, & Gollwitzer, 2012](#); [Bonanno & Burton, 2013](#); [Nelson, 1996](#)). In studies of social competence, individual differences in discriminative facility (the ability to sensitively and accurately detect subtle cues in social situations) have been linked to more complex (contextualized) encoding of social information ([Chiu et al., 1995](#)). Coping flexibility, the appropriate endorsement of distinct coping strategies in confronting controllable versus uncontrollable stressful situations, also leads to better psychological adjustment ([Cheng, 2003a, 2003b](#); [Cheng et al., 2012](#); [Cheng, Chiu, Hong, & Cheung, 2001](#); [Chiu et al., 1995](#)). Emotion regulation flexibility is also related to better well-being; college students in New York City who could more flexibly shift between enhancing and suppressing emotions in a laboratory task showed less distress two years after the September 11, 2001 attacks than students who were only equipped with one strategy ([Bonanno, Papa, Lalande, Westphal, & Coifman, 2004](#)). In addition, the ability of low socioeconomic individuals to flexibly shift between acceptance and persistence is related to a reduction in chronic disease ([Chen, 2012](#)). In sum, across domains, research increasingly suggests that flexible shifting of behavior is more critical for success and well-being than mastery of any single response.

### Metamotivational Awareness of Task-Motivation Fit

In the current paper, we specifically examined the metamotivational knowledge individuals possess about which motivational states are most useful for meeting the processing demands of particular tasks (task knowledge), as well as what steps can be taken to induce these states (strategy knowledge). We examined whether this knowledge is accurate and whether people use it to guide their behavior. Although we believe that the principles of metamotivation outlined above are broadly applicable, we drew upon existing research based on one particular motivational theory, regulatory focus ([Higgins,](#)

[1997](#)), to initially test these ideas. This was an ideal domain in which to begin our exploration for a few reasons. First, the theory not only differentiates between two qualitatively different motivational states and strategies, but there is also strong empirical evidence for how particular regulatory strategies (eagerness, vigilance) fit with specific motivational orientations (promotion, prevention) and certain types of tasks (divergent, analytic). Second, given the fundamental nature of promotion and prevention motivations and the prominence of regulatory focus theory, it is important to understand what types of metamotivational knowledge and beliefs individuals draw on when regulating these motivations.

Regulatory focus theory ([Higgins, 1997](#)) differentiates between two distinct motivational orientations (promotion, prevention) that regulate different but critical survival needs (nurturance, security). Each orientation is characterized by particular motivational concerns and sensitivities. Within a promotion orientation, individuals represent goals as ideals, strive for advancement, and are particularly sensitive to the difference between gains and nongains. In contrast, within a prevention orientation, individuals represent goals as duties, focus on the maintenance of security, and are particularly sensitive to the difference between nonlosses and losses. While individuals can differ chronically in terms of which of these orientations predominates, tasks and situations can also vary in the extent to which they activate prevention and promotion concerns (e.g., [Cesario & Higgins, 2008](#); [Freitas & Higgins, 2002](#)). Extensive research (see [Higgins, 2000](#)) has also established that each motivational orientation includes preferences for specific kinds of regulatory strategies (these strategies are distinct from the metamotivational strategy knowledge discussed earlier<sup>2</sup>). Eager strategies (e.g., enthusiastically seeking opportunities for gain) fit promotion motivational concerns with advancement and maximization of gains, whereas vigilant strategies (e.g., carefully protecting against potential losses) fit prevention

<sup>2</sup> Regulatory strategies are the behavioral or information processing strategies that an individual employs to move closer to his or her desired end-state. In contrast, we define metamotivational strategies as the strategies that an individual uses to induce a motivational orientation that will lead to the selection and effective execution of regulatory strategies that are appropriate for the given task.

motivational concerns with security, minimization of loss, and maintenance of the status quo.

Research has shown that there are motivational benefits of using strategies that fit a given system. When individuals use a strategy that fits their underlying motivational orientation, they feel right, they are more engaged, and they perform better (Cesario, Grant, & Higgins, 2004; Cesario & Higgins, 2008; Higgins, 2006; Higgins, Chen Idson, Freitas, Spiegel, & Molden, 2003). There are at least two ways in which this fit can arise: orientation-strategy fit and task-strategy fit. For instance, an individual who is chronically prevention-oriented will be more engaged when assigned to use vigilant strategies, just as a chronically promotion-oriented individual will be more engaged when assigned to use eager strategies (Higgins, 2006). When tasks are not characterized by particular strategic concerns, individuals who do best may be those who employ regulatory strategies that fit their chronic orientations.

However, in many cases, tasks themselves are most effectively performed with a particular type of strategy. For instance, tasks that rely primarily on divergent thinking such as creativity tasks are typically best accomplished with eager versus vigilant strategies (Friedman & Förster, 2001, though see Baas, De Dreu, & Nijstad, 2011). Tasks that rely primarily on convergent thinking such as analytical and proofreading tasks are typically best accomplished with vigilant versus eager strategies (Förster, Higgins, & Bianco, 2003; Seibt & Förster, 2004). When anticipating a proofreading task, therefore, performance will be optimized to the extent that one induces a prevention orientation that facilitates adoption of a

vigilant strategy. When anticipating a brainstorming task, performance will be optimized to the extent that one induces a promotion orientation that facilitates adoption an eager strategy. Furthermore, although it is possible to adopt a vigilant strategy without having a prevention orientation (and to adopt an eager strategy without having a promotion orientation), this strategy will be carried out more effectively when it matches one's current orientation; that is, when there is an orientation-strategy fit *in addition* to a task-strategy fit (we call this task-motivation fit; see Figure 1). This suggests that, for example, individuals will perform best on a proofreading task by inducing a prevention orientation in themselves and then vigilantly completing the task.

Although research on regulatory fit suggests that performance is optimized when individuals use strategies that “fit” both their motivational orientation and the processing demands of the task, what we do not know, and what is critical for accurate metamotivation, is whether people have any sense of this themselves and can take steps to increase motivational preparedness. Thus, the goal of the current studies is to examine first-generation questions about whether people have accurate metamotivational awareness of task-motivation fit in the realm of regulatory focus. While it is possible that people exhibit metamotivational awareness of task-motivation fit, it is also possible that people are indifferent to motivation quality (i.e., they switch between prevention and promotion motivational states without regard to task type), always prefer one type of motivation over the other (e.g., always prefer or choose promotion motivational states regardless of task type), or

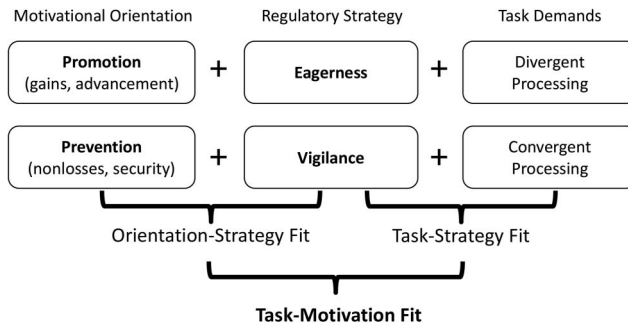


Figure 1. Model of task-motivation fit as applied to regulatory focus theory.

are more sensitive to some types of task demands than others (e.g., more sensitive to the demands of eager vs. vigilant tasks). Addressing this gap in our knowledge is the goal of the current investigation.

### Overview of Current Studies

In five studies, we examined the nature of people's metamotivational awareness of task-motivation fit in the realm of regulatory focus. Across all studies, we employed a paradigm adapted from work on instrumental emotion regulation (Ford & Tamir, 2012; Hackenbracht & Tamir, 2010; Tamir, 2009; Tamir & Ford, 2012; Tamir, Mitchell, & Gross, 2008). Tamir and colleagues suggest that individuals not only regulate their emotions to feel better (hedonic regulation), but also to harness affect that is strategically useful (instrumental regulation). For instance, individuals prefer to listen to anger-inducing music before a confrontation in which they must be aggressive, but prefer to listen to happiness-inducing music before a confrontation in which their goal is relationship harmony (Ford & Tamir, 2012). Similarly, in our initial study, we examined whether individuals would prefer to engage in promotion orientation-inducing recall activities before completing tasks that require eager or creative processing strategies, but prefer prevention orientation-inducing recall activities before completing tasks that require vigilant or analytic strategies. We further explored the extent to which this metamotivational awareness is related to performance expectancies (Studies 2–4) and whether this awareness is translated into effective behavior (Studies 3–5).

### Study 1

The goal of Study 1 was to establish whether individuals exhibit metamotivational awareness regarding task-motivation fit. To assess metamotivational awareness, we examined whether individuals reported preferences to engage in recall activities that are known to activate motivational states appropriate for upcoming tasks. As noted above, we adapted a paradigm employed by Tamir and colleagues in the emotion regulation literature (Tamir & Ford, 2009) to assess these preferences. Specifically, participants rated their preferences for a variety of

different recall activities (neutral, promotion orientation-inducing, or prevention orientation-inducing) prior to working on a number of tasks that varied in terms of their motivational demands. Some of the tasks were described as requiring eager and creative information processing strategies, whereas others were described as requiring vigilant and analytic strategies. If individuals exhibit metamotivational awareness of task-motivation fit, participants should exhibit a preference to recall promotion orientation-inducing (vs. prevention orientation-inducing) memories prior to eagerness tasks and prevention orientation-inducing (vs. promotion orientation-inducing) memories prior to vigilance tasks.

We decided to collect data from approximately 100 participants for this study. All variables were manipulated within-participant. A priori, our decision was based on the typical sample sizes used in regulatory focus research and the availability of participants in the participant pool. Using G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007), and assuming a correlation between repeated measures of .5 and a medium effect size (the average for regulatory fit studies; Motyka et al., 2014), we determined that our obtained sample of 105 participants provided over 99% power to detect a medium size interaction effect for our preference measure (Cohen's  $f = .25$ ;  $\eta_p^2 = .06$ ) based on Cohen's (1992) conventions (we treated task type as a between-participants variable given that G\*Power does not currently support testing this type of repeated measures interaction; thus, this may be a conservative estimate).

### Method

**Participants and design.** One hundred five undergraduates at a large Canadian university (89 females, 3 did not report gender) completed this online study in exchange for course-credit. The two critical variables, task type (eager, vigilant) and recall type (promotion, prevention, neutral), were manipulated within-participant. There were no significant main effects or interactions with gender.

**Procedure and materials.** Participants were told that this was a study about memory and performance. Specifically, participants were told, "In the second part of today's study, you are going to do some tasks that have been

shown to be predictive of success and well-being in life. Before you do that, however, you'll engage in different kinds of recall tasks. We're going to start off by giving you descriptions of the kinds of tasks that you'll be doing in the second part of the study. After each description, we're going to ask you to rate how much you'd like to perform various recall activities before doing that particular task." This methodological approach was closely modeled after Tamir and Ford (2009).

Participants then completed 48 preference ratings in which they were given a task description (e.g., "Your goal is to be as accurate as possible by making sure to avoid lurking errors and pitfalls") and a recall activity (e.g., "Please write about a time in the past when you felt you made progress toward being successful in life") and had to indicate, for each pair, how much they would prefer to complete this recall activity *before* doing the task, on a scale from 1 (*not at all*) to 7 (*very much*). Participants completed recall preference ratings for 2 vigilance tasks and 2 eagerness tasks for each of 4 recall activities that induce promotion, 4 recall activities that induce prevention, and 4 neutral recall activities. Items were presented in a random order for each participant. Promotion and prevention recall activities were selected on the basis of prior research (e.g., Freitas & Higgins, 2002; Freitas et al., 2002; Higgins et al., 2001, 1994; Liberman et al., 2001). The complete text for the recall activities and task descriptions are included in the Appendix.<sup>3</sup>

## Results

To assess the pattern of recall preferences, six indices were created to assess the preferences for promotion, prevention, and neutral recall activities for eager and vigilant tasks, respectively. Each index was comprised of 8 items and the reliabilities were consistently high (all  $\alpha$ s > .86). In the analyses reported below and in subsequent studies, *t* tests are based on comparisons of the estimated marginal means from the repeated-measures ANOVA. The descriptive statistics provided below are the actual means and standard deviations.

A repeated measures analysis with 2 factors (task type, recall type) revealed a main effect of recall type,  $F(2, 208) = 7.012, p = .001, \eta_p^2 = .06$ , such that participants preferred both pro-

motion ( $M = 4.29, SD = 1.19$ ) and neutral ( $M = 4.23, SD = 1.35$ ) recall activities to prevention ( $M = 3.90, SD = 1.20$ ) recall activities ( $t(103)_{\text{promotion vs. prevention}} = 5.86, p < .001; t(103)_{\text{neutral versus prevention}} = 2.67, p = .009$ ). There was no main effect of task type,  $F(1, 103) = .51, p = .48$ . As predicted, there was also a significant Task Type  $\times$  Recall Type interaction,  $F(2, 208) = 9.09, p < .001, \eta_p^2 = .08$  (see Figure 2). Participants preferred promotion recall activities when anticipating an eagerness task ( $M = 4.37, SD = 1.22$ ) relative to a vigilance task ( $M = 4.21, SD = 1.15$ ),  $t(104) = 2.10, p = .04$ . In contrast, participants preferred prevention recall activities when anticipating a vigilance task ( $M = 4.04, SD = 1.19$ ) relative to an eagerness task ( $M = 3.75, SD = 1.22$ ),  $t(104) = 3.10, p = .003$ . There was no difference in preference for neutral recall activities when anticipating vigilance tasks ( $M = 4.23, SD = 1.33$ ) versus eagerness tasks ( $M = 4.23, SD = 1.36$ ),  $t(104) = .049, p = .96$ .

## Discussion

Study 1 provides preliminary support for the proposal that people exhibit at least some metamotivational awareness of task-motivation fit. Prior research suggests that people do indeed perform better when they are induced into a prevention orientation when performing vigilance tasks or induced into a promotion orientation when performing eagerness tasks (Latimer et al., 2008; Spiegel, Grant-Pillow, & Higgins, 2004). This first study shows that participants have some insight into how to effectively utilize these motivational systems: they exhibited a greater preference for recall activities that would induce prevention motivation when anticipating vigilance rather than eagerness tasks, but a greater preference for recall activities that would induce promotion motiva-

<sup>3</sup> At the end of this and all subsequent studies, participants completed a few individual difference measures (including a chronic measure of regulatory focus and a modified self-reflection scale). We examined whether the modified self-reflection scale, hypothesized to potentially tap individual differences in metamotivational sensitivity, predicted metamotivational awareness, but obtained very inconsistent effects across studies. We summarize the analyses of this individual difference measure in the online supplemental material and are happy to provide additional details upon request.

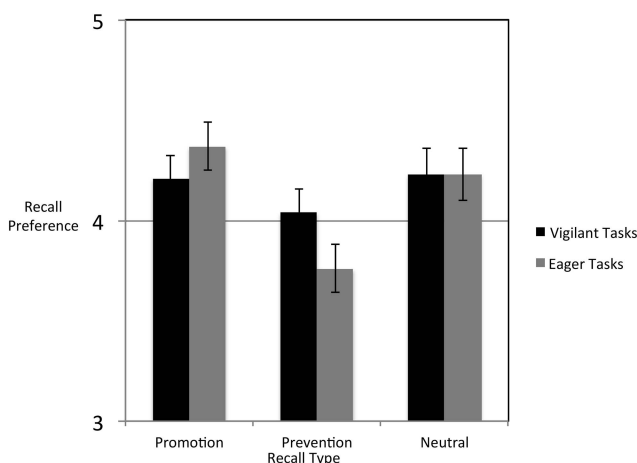


Figure 2. Recall preferences as a function of recall type and task type (Study 1). Error bars indicate 2 standard errors.

tion when anticipating eagerness rather than vigilance tasks. This finding is interesting not only as an example of metamotivational awareness, but for what it reveals about people's knowledge of promotion and prevention motivations. Although prior work has established that these motivational systems are powerful and predict a number of important outcomes, this is the first work to directly examine whether individuals are attuned to the subtle, qualitative differences between these motivations described by regulatory focus theory (Higgins, 1997). It is important to note that there are a number of ways that this metamotivational awareness could arise. For instance, accurate metamotivational awareness could reflect more deliberative, logical assessment or could emerge more spontaneously from a sense of fluency that comes from the activation of corresponding concepts. Such possibilities, beyond the scope of the current manuscript, will be exciting to explore in future research.

Although the predicted pattern was obtained, it is worth bearing in mind that the preference ratings may reflect at least two components: (a) the extent to which the recall task is perceived to be enjoyable and motivating in and of itself and (b) whether the recall task is perceived as "fitting" with the subsequent task. In this context, the main effect for type of recall is revealing and important in its own right.

One possibility is that this main effect preference reflects the North American culture in

which the study was conducted. Studies of regulatory focus predominance across cultures have provided evidence that North Americans (in contrast to East Asians, e.g.) tend to be predominantly promotion-oriented (Higgins, 2008); North American culture values fun, excitement, and the pursuit of gains. People may find memories that induce promotion motivation more appealing than memories that induce prevention motivation. It is also possible that in this cultural context, promotion motivation is typically perceived as generally more motivating than prevention motivation; this is a culture that has embraced the boundless possibilities of high self-esteem and a positive outlook (Scholer, Ozaki, & Higgins, 2014). In addition, promotion eagerness is a *positive* high arousal state, whereas prevention vigilance is typically experienced as a relatively negative high arousal state. All else being equal, most people prefer to feel positive versus negatively valenced emotions. This parallels findings in the instrumental emotion regulation literature in which even participants who demonstrate an increased preference for anger inducing activities prior to a confrontation still showed a dominant preference for happiness inducing activities (Tamir & Ford, 2012).

It is also possible that there is an asymmetry in accurate metamotivational awareness for eager versus vigilant tasks. The interaction exhibited a crossover pattern when ex-

aming preferences for promotion (or prevention) recall in preparation for vigilant versus eager tasks. However, when one examines the contrast within task type, it is clear that participants exhibited greater differentiation of motivational states for eager versus vigilant tasks. For eager tasks, participants significantly preferred promotion versus prevention recall prompts. However, for vigilant tasks, participants preferred promotion and prevention recall prompts equally. As noted above, this could be attributed to a main effect preference for promotion motivation. It may also reveal something interesting about participants' metamotivation about vigilant tasks. One possibility is that participants are better at recognizing that prevention motivation is harmful for eager tasks than at recognizing that promotion motivation could be harmful for vigilant tasks. However, the fact that participants preferred promotion-inducing activities significantly less when anticipating vigilant tasks than when anticipating eager tasks suggests that they may (at the very least) realize that promotion-inducing tasks are not fully compatible with vigilant tasks. We touch on these interesting possibilities throughout and return to them in the General Discussion.

In sum, despite the general appeal of the promotion recall activities, we still obtained initial evidence that individuals are aware of how different recall activities fit distinct tasks. This provides initial support for the idea that individuals may, on average, be sensitive to the need to shift the quality of motivation given different task demands. Specifically, as predicted, we found a *relative* shift in preference for prevention versus promotion recall activities when anticipating vigilant versus eager tasks. Somewhat surprising were the generally high ratings for neutral recall activities for both vigilant and eager tasks. Importantly, there were no differences in neutral recall preferences across task type, but the popularity of our neutral recall activities was still higher than anticipated. It is possible that the neutral recall activities were perceived to be enjoyable (relative to prevention recall activities in particular), not that they were perceived as fitting well with the subsequent tasks. In Study 2 we modified our neutral recall activities to reduce their positivity and

attempted to better isolate the component of recall preference that reflects participants' perceptions of "fit" between recall activities and task type.

## Study 2

Study 2 was designed to extend Study 1 by better isolating the "fit" component of participant recall preferences. To do so, we measured performance expectancies in addition to recall preferences. Specifically, after participants provided recall preferences, we also asked them to indicate how well they would expect to perform on each task if they had just completed a given recall prompt. As they did for recall preferences, participants completed these measures for all combinations of task type and recall activity. Including this measure not only allowed us to assess whether the pattern of results for performance expectancies mirrored that of recall preferences, but also whether those performance expectancies predicted recall preferences.

## Method

**Participants and design.** One hundred five undergraduates at a large Canadian university (67 females, 9 did not report gender) completed this online study in exchange for course credit. The two critical variables, task type (eager, vigilant) and recall type (promotion, prevention, neutral) were manipulated within-participant. There were no significant main effects or interactions with gender.<sup>4</sup>

**Procedure and materials.** The procedure was identical to Study 1, with the following changes and additions. The four neutral prompts were revised to create items that were more neutral (less positive); see the [Appendix](#). After completing the recall preference ratings, participants provided performance expectancy rat-

<sup>4</sup> Some participants skipped several questions, especially for performance expectancies, leading to different *df* across analyses. Rather than excluding these participants outright, we conducted the analyses on the full sample available for each dependent measure. However, we also conducted the analyses excluding any participant who skipped at least one section of the study ( $n = 9$ ) and the pattern and statistical significance of all results remained the same.



ings.<sup>5</sup> For these ratings, participants were presented with each task description again and asked to indicate, for each of the 12 recall activities “how successful you would expect to be at the task after each activity” on a scale from 1 (*not at all*) to 8 (*extremely*). These were presented in random order.

## Results

**Recall preferences.** Recall preference indices were created exactly as in Study 1 (all  $\alpha > .87$ ). In a repeated measures analysis with 2 factors (task type, recall type), there was a main effect of recall type,  $F(2, 204) = 10.91, p < .001, \eta_p^2 = .10$ . Replicating Study 1, participants preferred promotion recall activities ( $M = 4.34$ ) to both prevention ( $M = 4.01, t(101) = 4.50, p < .001$ , and neutral ( $M = 3.79$ ) recall activities,  $t(101) = 3.70, p < .001$ . Participants also marginally preferred prevention to neutral recall activities,  $t(101) = 1.81, p = .07$ . There was no main effect of task type,  $F(1, 102) = .12, p = .73$ .

As predicted, and also replicating Study 1, there was a significant Task Type  $\times$  Recall Type interaction,  $F(2, 204) = 24.36, p < .001, \eta_p^2 = .19$  (see Figure 3). Participants preferred promotion recall activities when anticipating an eagerness task ( $M = 4.47, SD = 1.20$ ) versus a vigilance task ( $M = 4.20, SD = 1.22$ ),  $t(102) = 3.63, p < .001$ . In contrast, participants preferred prevention recall activities when anticipating a vigilance task ( $M = 4.25, SD = 1.26$ ) versus an eagerness task ( $M = 3.70, SD = 1.30$ ),  $t(102) = 4.569, p < .001$ . Unexpectedly, there was also a difference in preference for neutral recall activities when anticipating vigilance tasks ( $M = 3.70, SD = 1.54$ ) versus eagerness tasks ( $M = 3.87, SD = 1.59$ ),  $t(102) = 2.52, p = .01$ .

**Expectancy ratings.** The pattern for performance expectancy ratings closely mirrored that of the recall preferences. In a repeated measures analysis with 2 factors (task type, recall type), there was a main effect of recall type,  $F(2, 190) = 36.10, p < .001, \eta_p^2 = .28$ . Participants expected to perform better following promotion ( $M = 5.17, SD = 1.33$ ) recall activities relative to both prevention ( $M = 4.54, SD = 1.50$ ),  $t(94) = 6.74, p < .001$ , and neutral ( $M = 3.91, SD = 1.85$ ) recall activities,  $t(94) = 6.89, p < .001$ . Participants also expected to

perform better following prevention compared with neutral recall activities,  $t(94) = 4.09, p < .001$ . In addition, there was a main effect of task type,  $F(1, 95) = 16.37, p < .001, \eta_p^2 = .15$ , such that participants expected to perform better on vigilance ( $M = 4.67, SD = 1.53$ ) versus eagerness ( $M = 4.41, SD = 1.60$ ) tasks.

As predicted, these main effects were qualified by a significant task type  $\times$  recall type interaction,  $F(2, 190) = 19.89, p < .001, \eta_p^2 = .17$  (see Figure 4). Participants expected to perform better on an eagerness task ( $M = 5.29, SD = 1.39$ ) versus a vigilance task ( $M = 5.04, SD = 1.27$ ) when completing promotion recall activities prior to task performance,  $t(95) = 2.53, p = .01$ . In contrast, participants expected to perform better on a vigilance task ( $M = 5.01, SD = 1.42$ ) versus an eagerness task ( $M = 4.07, SD = 1.58$ ) when completing prevention recall activities prior to task performance,  $t(95) = 5.99, p < .001$ . There was no difference in performance expectancies for vigilance tasks ( $M = 3.96, SD = 1.86$ ) versus eagerness tasks ( $M = 3.86, SD = 1.84$ ) when completing neutral recall activities prior to task performance,  $t(95) = .87, p = .39$ .

**Predicting accurate recall preferences.** We calculated a preference index based on participants' recall preference ratings ([Promotion Recall Preferences for Eager Tasks—Prevention Recall Preferences for Eager Tasks] + [Prevention Recall Preferences for Vigilant Tasks—Promotion Recall Preferences for Vigilant Tasks]). Higher numbers on this recall

<sup>5</sup> Prior to completing the expectancy ratings, participants were randomly assigned to complete a commonly employed regulatory focus manipulation and answer some emotion questions as an exploratory measure (we originally thought that having direct experience with a regulatory focus induction could influence participants' subsequent ratings, but this was not the case). The regulatory focus essay manipulation asked participants to reflect on how their hopes and aspirations (promotion manipulation) or duties and obligations (prevention manipulation) had changed since childhood (Higgins et al., 1994). Participants rated 9 semantic differential items on a 6-pt scale (sad-happy, dejected-elated, anxious-calm, fearful-relaxed, negative-positive, bad-good, cautious-excited, careful-enthusiastic, vigilant-eager). There were no differences between conditions on an overall emotion index,  $F(1, 94) = .05, p = .82$  (Prevention  $M = 3.99, SD = .73$ ; Promotion  $M = 4.03, SD = .94$ ) nor on any of the individual items. Controlling for essay condition in analyses of any variables that followed these items did not change the pattern or significance of findings.

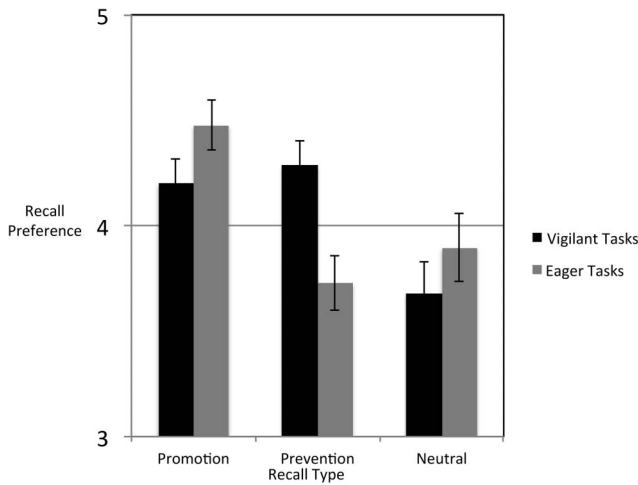


Figure 3. Recall preferences as a function of recall type and task type (Study 2). Error bars indicate 2 standard errors.

preference index indicate that participants demonstrated greater metamotivational awareness: relatively greater preference for promotion recall activities when anticipating eager tasks and relatively greater preference for prevention recall activities when anticipating vigilant tasks. A parallel index was constructed for performance expectancies. As predicted, more accurate performance expectancies were positively

correlated with more accurate recall preferences,  $r = .61, p < .001$ .

**Discussion**

Study 2 provided further evidence that individuals exhibit metamotivational awareness of task-motivation fit. Replicating the pattern of results from Study 1, participants exhibited a

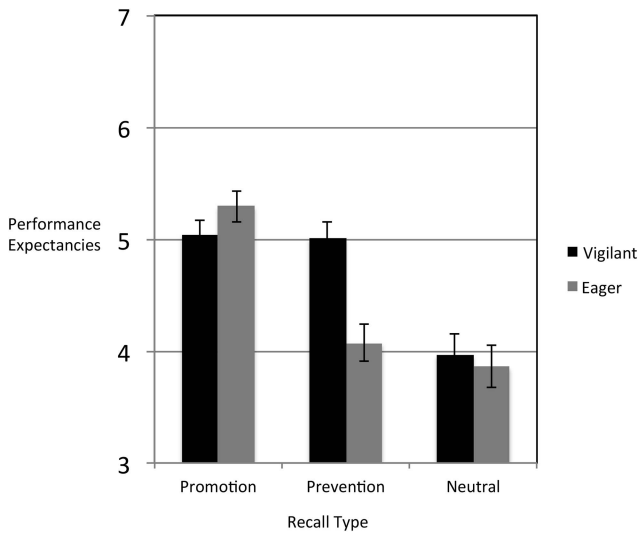


Figure 4. Performance expectancies as a function of recall type and task type (Study 2). Error bars indicate 2 standard errors.

greater preference for prevention-inducing recall activities when expecting to complete vigilance rather than eagerness tasks and a greater preference for promotion-inducing recall activities when expecting to complete eagerness rather than vigilance tasks. This same interaction was also observed for performance expectancies: Participants expected to perform better on vigilance tasks when engaging in prevention versus promotion-focused recall and expected to perform better on eagerness tasks when engaging in promotion versus prevention-focused recall.

Although it was important to observe the predicted interaction using a measure of performance expectancies that more clearly assessed the “fit” component of participants’ preferences, the pattern of results was revealing in another way. For both recall preferences and performance expectancies, we observed a main effect of recall type such that participants preferred promotion recall prompts and expected to perform better (on average) after engaging in promotion (vs. prevention) recall activities. As noted in Study 1, recall preferences likely reflect not only the extent to which participants perceive task-motivation fit, but also the extent to which the recall activities themselves are inherently appealing or enjoyable. For reasons enumerated in Study 1, it is therefore not surprising to again observe that promotion-focused (vs. prevention-focused) recall was more appealing to our North American participants. It might be less clear why this main effect was observed for performance expectancies. That is, why should participants generally think that they will perform better when in a promotion motivational state than in a prevention state? One possibility is that this association may exist because of a cultural understanding about what it means to get oneself motivated. In a culture that is predominantly promotion-focused, it is possible that the idea of increasing motivation has become closely tied to the idea of increasing eagerness, as reflected in common expressions such as getting “pumped up” or “psyched” for goal pursuit. Similarly, there may be a general “feel better, do better” heuristic that makes participants think that the hedonically more positive promotion induction will be more effective (King, McInerney, Ganotice, & Villarosa, 2015; Villavicencio & Bernardo, 2013). It is also possible, as we suggested in the Study 1 Discus-

sion, that participants are more sensitive to the motivational demands of eager versus vigilant tasks. As we proceed (Studies 3–5), these factors—metamotivational awareness of task-motivation fit (as reflected in the observed task type x recall type interaction) and the pull toward promotion motivation (as reflected in the main effect of recall type)—may have important implications for when individuals are successfully able to enact metamotivational awareness of task-motivation fit.

### Study 3

In Studies 1 and 2, participants indicated recall preferences for numerous combinations of tasks and recall activities. Although the instructions suggested to participants that they would be doing such a combination of activities later, the preference ratings themselves were unlikely to feel truly consequential (i.e., it was clear to participants that it would not be possible to do *all* recall activities and tasks in the course of the study). In addition, the continuous measure of recall preference itself is not binding; participants were simply indicating degree of preference. Further, the first two studies provided somewhat vague descriptions of unnamed tasks that the participants may have had trouble imagining themselves engaging in had they been asked to make a concrete decision about which task to complete. Thus, it is not apparent from the first two studies if the same pattern of metamotivational awareness effects we observed in Studies 1 and 2 would persist if people were making consequential choices.

Study 3 was designed to address this question. It is clear from Studies 1 and 2 that our participants had competing metamotivational beliefs: awareness of task-motivation fit *and* a general preference for promotion motivation. When actually choosing what to do, people may be more likely to focus on the general appeal or attractiveness of a given motivational state than on their concerns about task-motivation fit. If so, metamotivational awareness of task-motivation fit reflected in performance expectancies might not easily translate to consequential behavioral choices.

Study 3 included a measure of performance expectancies (as in Study 2), as well as a measure of consequential behavioral choice. The study also specified tasks with which the par-

ticipants were most likely familiar (as opposed to only including more abstract descriptions). We included two concrete tasks for each general task category (eager, vigilant) to examine, in part, if the results would generalize across tasks. This allowed us to examine, in a single study, whether the metamotivational awareness that is evident from people's expectancies influences their choice of tasks.

## Method

**Participants and design.** One hundred ninety-six undergraduates at a large private university in the Northeastern U.S. (139 females) completed the lab-based study in exchange for \$8. We doubled our sample size in this study because task type was now manipulated as a between-participants variable: We wanted to ensure that we had adequate power to detect an effect on behavior. Participants were randomly assigned to one of two anticipated task types (eager, vigilant). Recall type (promotion, prevention) was manipulated as a within-participant variable. Prior to analysis, the data from 11 participants were excluded (9 due to computer problems, 1 for not reading the instructions, and 1 for leaving the room in the middle of the study). Using G\*Power and assuming a correlation between repeated measures of .5, we computed that the 185 remaining participants provided more than 99% power to detect a medium size interaction effect for our expectancy measure (Cohen's  $f = .25$ ;  $\eta_p^2 = .06$ ) and 77% power to detect a small interaction (Cohen's  $f = .1$ ;  $\eta_p^2 = .01$ ), based on Cohen's (1992) conventions. We also determined that the sample size provided 98% power to detect a medium sized effect (Cohen's  $w = .3$ ) of task type on recall activity choice. Although gender generally did not affect the results of the study, we did find one interaction involving gender, which we note below.

**Procedure and materials.** Participants were told that they would be performing "two skills tasks that have been shown to be predictive of success and well-being in life." They were also told that, prior to this, we wanted them "to pick recall activities to engage in before each of the two skills tasks." Although the descriptions of the skills tasks were similar to the descriptions used in the two previous studies, we gave the tasks names that participants

were presumably familiar with and associated with certain processing demands (e.g., "brainstorming task"), thus increasing the environmental validity of the study. Within each condition, the order of the two tasks was randomized across participants. After reading a description of each task, participants were asked to choose from a list four recall activities (two promotion-inducing and two prevention-inducing, presented in a random order). They were then asked to rate how successful they expected to be at the skills task after completing each of the four recall activities on a scale of 1 (*not at all*) to 8 (*extremely*).

**Eager tasks.** For participants assigned to the eager condition, one task was described as a "brainstorming task" in which their goal was "to be as creative as possible," while the other task was described as a "creative writing task" in which their goal was "to imagine a future no one has seen before by seeing possibilities and occasions for advancement."

**Vigilant tasks.** For participants assigned to the vigilant condition, one task was described as a "proofreading task" in which their goal was "to be as accurate as possible," while the other task was described as an "analytic problem solving task" in which their goal was "to be precise and to make sure that you don't make a wrong turn in figuring out the right answer."

**Recall activities.** Two sets of recall activities (each with two promotion-inducing activities and two prevention-inducing activities) were used. One set was presented as the options for the brainstorming and proofreading tasks, whereas the other set was presented as the options for the creative writing and analytic problem solving tasks. The recall activities were the same as those used in the previous two studies, with minor wording changes.

Next, to avoid deception, we allowed participants to briefly engage in the recall activities they had selected and the skills tasks to which they had been assigned. This part of the study was treated as a pilot for future experiments. Finally, participants answered some questions about their prior experience with the skills tasks and then completed a suspicion check and demographics questionnaire.

## Results

**Performance expectancies.** Similar to the pattern observed in Study 2, participants exhibited a pattern of performance expectancies suggesting metamotivational awareness. To analyze expectancies, we conducted a 2 (task type: eager vs. vigilant)  $\times$  2 (recall activity type: promotion-inducing vs. prevention inducing)  $\times$  2 (activity set: brainstorming/proofreading vs. creative writing/analytic problem solving) mixed ANOVA. Activity set was included as a factor so that we could determine whether metamotivational awareness was present for both sets of recall activities (i.e., the ones that served as options for the brainstorming and proofreading tasks, as well as the ones that were options for the creative writing and analytic problem solving tasks).

The results of the analysis revealed a main effect of task type,  $F(1, 183) = 6.04, p = .02, \eta_p^2 = .03$ , such that participants who were assigned vigilant tasks expected to be more successful than participants who were assigned eager tasks. There was also a main effect of recall activity type,  $F(1, 183) = 68.76, p < .001, \eta_p^2 = .27$ , such that participants expected to be more successful after completing promotion-inducing activities as opposed to prevention-inducing activities. There was no main effect of activity set,  $F(1, 183) = .37, p = .54, \eta_p^2 = .002$ . Importantly, the Task Type  $\times$  Recall Activity Type interaction found in Study 2 was again significant,  $F(1, 183) = 14.06, p < .001, \eta_p^2 = .07$  (see Figure 5), and was not moderated by activity set,  $F(1, 183) = .03, p = .86, \eta_p^2 < .001$ .<sup>6</sup> Replicating the pattern observed in Study 2, participants expected to perform better in the vigilance tasks ( $M = 5.40, SD = 1.24$ ) than the eagerness tasks ( $M = 4.67, SD = 1.33$ ) when completing prevention-inducing recall activities prior to task performance,  $t(183) = 3.81, p < .001$ . Unlike Study 2, however, we did not observe a significant difference in performance expectancies for the vigilance tasks ( $M = 5.84, SD = 1.14$ ) versus the eagerness tasks ( $M = 5.84, SD = 1.02$ ) when participants anticipated completing promotion-inducing recall activities prior to task performance,  $t(183) = .04, p = .97$ . However, the difference in performance expectancies for promotion (vs. prevention) recall were significantly greater in the eagerness

task,  $t(183) = 8.49, p < .001$ , than the vigilance task,  $t(183) = 3.22, p < .002$ .

**Recall activity choice.** In contrast to the interaction observed for performance expectancies, participants were more likely to select a promotion-inducing activity than a prevention-inducing activity for both choices (73% and 76%, respectively; binomial test,  $ps < .001$ ). Neither effect was moderated by task type ( $\chi^2s < .15, ps > .70$ ). To examine whether task type affected participants' likelihood of selecting promotion-inducing or prevention-inducing recall activity for both tasks, we computed a combined choice variable, such that 1 = choice of two promotion-inducing activities, 0 = choice of one promotion-inducing and one prevention-inducing activity, and -1 = choice of two prevention-inducing activities. A chi-square analysis of this variable indicated a surprising effect of task type ( $\chi^2 = 6.04, p < .05$ ), such that participants in the eager task condition were more likely than participants in the vigilant task condition to choose two prevention-inducing activities (11% vs. 3%) and less likely to switch their choice from a promotion-inducing to prevention-inducing activity or vice versa (30% vs. 43%). This effect was driven primarily by female participants ( $\chi^2 = 7.88, p = .02$ ), as opposed to male participants ( $\chi^2 = .31, p = .86$ ).

## Discussion

Study 3 found a similar pattern of metamotivational awareness on performance expectancies, though this effect was weaker than in the previous studies. Although participants expected to perform better on vigilant versus eager tasks after prevention recall, they did not expect any performance difference on vigilance versus eager tasks after promotion recall. Further, although participants reported performance expectancies that reflected at least partial awareness of task-motivation fit, participants overwhelmingly chose to engage in promotion recall regardless of whether they were anticipat-

<sup>6</sup> There was a significant Recall Activity Type  $\times$  Activity Set interaction,  $F(1, 183) = 8.71, p = .004, \eta_p^2 = .05$ , such that effect of recall activity type was stronger for the activity set associated with the creative writing/analytic problem solving tasks than with the set associated with the brainstorming/proofreading tasks, though it was significant in both cases ( $ps < .001$ ).

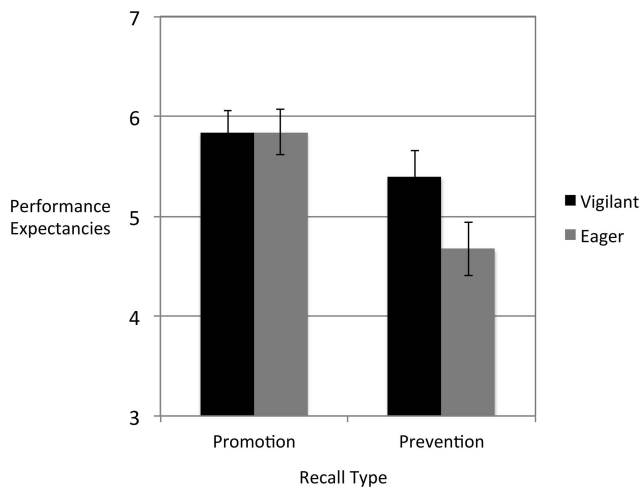


Figure 5. Performance expectancies as a function of recall type and task type (Study 3). Error bars indicate 2 standard errors.

ing an eager or vigilance task. We know from Studies 1 and 2 that participants exhibited a main effect preference for promotion recall. Similar to these studies, we observed that participants believed that promotion recall would lead to better performance than prevention recall, regardless of task type. Thus, although participants seemed to be metamotivationally aware of the *relative* advantage of prevention recall for vigilant versus eager tasks, this awareness of task-motivation fit was overshadowed by an overall confidence in promotion motivation. The behavioral measure reflected this confidence.

We believe that these data suggest an important insight regarding the distinction between monitoring and control in the context of motivation. In the metacognitive literature on learning, the failure to translate appropriate knowledge about learning strategies is sometimes attributed to lack of self-efficacy or effort (e.g., Komarraju & Nadler, 2013; Wolters & Hussain, 2015). Certainly, these factors are relevant for metamotivation as well. In addition, however, it may be especially important in the context of metamotivation to consider the existence of conflicting knowledge or beliefs that counteract one's metamotivational awareness of task-motivation fit. In this case, such beliefs may include the idea that people generally perform better when they are experiencing positive arousal (i.e., "pumped up"). Another possibility

is that that people are simply more sensitive to the motivational demands of some tasks than others and, thus, do not realize that prevention motivation may be more adaptive for vigilant tasks than promotion motivation.

#### Study 4

Study 3 was the first attempt to examine how metamotivational awareness was reflected in a consequential behavioral choice. Given the pattern of results for performance expectancies, it was perhaps not surprising that behavioral choice was guided by the main effect preference for promotion recall rather than by the recognition that prevention recall is relatively better for a vigilant task than for an eager task (reflected in the interaction). Nonetheless, we felt it was important to further investigate this pattern. Study 4 was designed as a conceptual replication of Study 3 with a few important changes.

In this study we modified our paradigm so that participants were choosing to complete their upcoming task with a gain-framed lottery structure that induces a promotion orientation or a loss-framed lottery structure that induces a prevention orientation (e.g., Higgins, Shah, & Friedman, 1997; Miele, Molden, & Gardner, 2009; Rosenzweig & Miele, 2016). This change had some important implications. First, this study allowed us to examine if and how our effects would replicate when participants were

provided with different options for inducing promotion or prevention motivations. Second, performance on the target task was more consequential than in Study 3: Participants had the possibility of winning entry into a cash lottery for good performance. Thus, if we failed to observe metamotivationally astute behavior in Study 3 because participants did not value performance on those tasks, this design change should minimize that possibility in the current study.

## Method

**Participants and design.** Two hundred two undergraduates at a large Canadian university (136 females, 1 participant did not provide gender) completed this online study in exchange for course-credit. As in Study 3, we doubled our sample size in this study because task type was manipulated as a between-participants variable, ensuring that we had adequate power to detect a medium sized effect on behavior. Participants were randomly assigned to one of two anticipated task types (eager, vigilant). There were no significant main effects or interactions with gender.

**Procedure and materials.** Participants first completed an attention check item. Participants had to get this item correct to proceed to the rest of the study (Oppenheimer, Meyvis, & Davidenko, 2009). Thus, no participants were excluded from the study; this procedure simply ensured that all participants were reminded to attend to instructions carefully. Participants then completed a number of background questionnaires.

Participants were then randomly assigned to believe that they would be doing an eager task (brainstorming) or a vigilant task (proofreading). Participants were told that performing well on this task would give them the chance to be entered into a lottery drawing for \$25. Participants were told to “select the incentive structure that you believe will best motivate you to perform well on this task.” They then had to choose one of two lottery incentive structures under which to do the task: a gains lottery or the losses lottery. Under both incentive structures, each point earned resulted in an entry into the draw.

The gains lottery that induces a promotion orientation was presented as “YOURS TO GAIN! At the end of the task, you will learn

your total number of points out of 25. Under this incentive structure, you begin with 0 points. For each correct response, you gain a point.” The losses lottery that induces a prevention orientation was presented as “YOURS TO LOSE! At the end of the task, you will learn your total number of points out of 25. Under this incentive structure, you begin with 25 points. For each incorrect response, you lose a point.”

After making their choice, participants provided performance expectancy ratings, indicating how successful they would expect to be at the task when completing it under each of the incentive structures on a scale from 1 (*not at all*) to 8 (*extremely*).<sup>7</sup>

Participants also completed demographic information. All participants were told that they would not need to complete their assigned task, but would still be entered into the draw. We held a draw at the conclusion of the study and contacted the winner.

## Results

**Performance expectancies.** Participants exhibited a pattern of performance expectancies that replicated the general pattern observed in Studies 2 and 3. In a mixed ANOVA with 2 factors (task type, lottery type), there was a main effect of lottery type,  $F(1, 198) = 23.03$ ,  $p < .001$ ,  $\eta_p^2 = .10$ , such that participants expected to perform better under the gains ( $M = 5.99$ ,  $SD = 1.40$ ) versus losses lottery ( $M = 5.20$ ,  $SD = 1.69$ ). There was no significant main effect of task type,  $F(1, 198) < 1$ ,  $p = .54$ .

As predicted, there was also a significant task type x lottery type interaction,  $F(1, 198) = 4.69$ ,  $p = .03$ ,  $\eta_p^2 = .02$  (see Figure 6). Under the prevention-inducing loss-framed lottery, participants reported marginally higher performance expectancies when expecting to complete the proofreading (vigilance) task ( $M = 5.44$ ,  $SD = 1.65$ ) versus the brainstorming (eagerness) task, ( $M = 4.98$ ,  $SD = 1.71$ ),  $t(198) = 1.87$ ,  $p = .06$ . Under the promotion-inducing gain-framed lottery, participants did not significantly differ in their performance expectancies for the brainstorming versus proofreading task,  $t(198) =$

<sup>7</sup> At the end of the study, participants also completed some mood measures. These measures came after the variables described here.

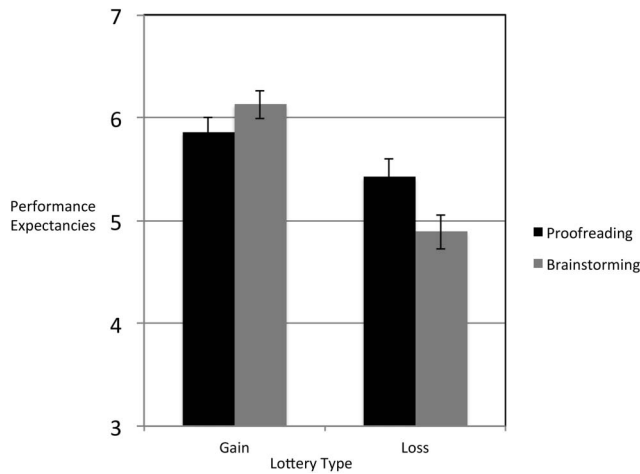


Figure 6. Performance expectancies as a function of recall type and task type (Study 4). Error bars indicate 2 standard errors.

1.37,  $p = .17$ , although the trend was that participants had higher performance expectancies for the brainstorming task ( $M = 6.13$ ,  $SD = 1.42$ ) versus the proofreading task ( $M = 5.86$ ,  $SD = 1.36$ ). Comparing within task, participants had significantly higher performance expectancies for the brainstorming task under the gains lottery ( $M = 6.13$ ,  $SD = 1.42$ ) versus the losses lottery ( $M = 4.98$ ,  $SD = 1.71$ ),  $t(198) = 4.95$ ,  $p < .001$ . This preference for the gains lottery was attenuated (and marginally significant) when anticipating the proofreading task,  $t(198) = 1.85$ ,  $p = .07$  ( $M_{\text{gains}} = 5.86$ ,  $SD = 1.36$ ;  $M_{\text{losses}} = 5.42$ ,  $SD = 1.65$ ).

**Lottery choice.** As in Study 3, there was no interaction effect for behavior. Overall, participants were more likely to choose the gains lottery (72%) over the losses lottery regardless of task condition, binomial test,  $p < .001$ . There was no significant difference in lottery choice by task condition,  $\chi^2 = 1.81$ ,  $p = .18$  (Choice of Gains Lottery in Proofreading Task Condition = 68%; Choice of Gains Lottery in Brainstorming Task Condition = 76%). Thus, the pattern of behavior replicated what we observed in Study 3.

## Discussion

Replicating what we observed in Study 3, participants exhibited some metamotivational awareness of task-motivation fit in their perfor-

mance expectancies. However, it appears that this awareness was not strong enough to overcome participants' general confidence in the promotion orientation induction. As in Study 3, participants overwhelmingly chose the promotion-inducing activity (gains lottery) regardless of whether they were anticipating an eager or vigilant task. This was the case even with a different manner of inducing regulatory focus and despite performance on the eager/vigilant tasks being more consequential than in Study 3.

## Study 5

In Studies 3 and 4, the metamotivational awareness of task-motivation fit reflected in participants' expectancies was not reflected in their behavior. Looking closely at the pattern of expectancies across conditions (see Figures 5 and 6), one could argue that this behavioral choice pattern is consistent with the *absolute* versus relative pattern of preference and performance expectancy ratings observed in Studies 2–4. In other words, although we generally observed the *relative* effects that we predicted for these continuous ratings (e.g., when comparing ratings of prevention-inducing recall activities for vigilant vs. eager tasks), there was still a dominant preference for promotion-inducing activities, even when anticipating a vigilant task (except in Study 2, where there was no mean



preference for either type of activity). Thus, as discussed earlier, these data suggest that participants may have competing metamotivational beliefs. On the one hand, performance expectancies reflect an awareness of or belief in task-motivation fit. On the other hand, performance expectancies reflect a strong confidence in the utility of promotion motivation regardless of task type.

What is not clear, however, is whether the choice can be structured in a way that makes it more likely that metamotivational awareness of task-motivation fit is translated into behavior. Therefore, in this study, we asked participants what type of task they would like to engage in given a particular type of recall, rather than asking them what type of recall they would like to engage in given a particular upcoming task. In this case, any preference for promotion motivation experienced in Studies 3 and 4 is irrelevant to the behavioral choice corresponding prevention motivation. Thus, participants who are *assigned* to perform a prevention-inducing recall activity (and who are not given the option to choose a more positive promotion-inducing recall activity) should choose to perform a task requiring vigilance over a task requiring eagerness *if* they are sensitive to task-motivation fit and expect to do better on a vigilance task when in a prevention motivational state.

Of course, it is still possible that there could be other factors that pull participants toward one task or the other. For the same reasons that promotion inductions are preferred to prevention inductions, eager tasks may be perceived as more attractive or easier to perform well on than vigilant tasks. However, there is also some mixed evidence from our earlier studies (Studies 2 and 3) that participants may expect to perform better on vigilant versus eager tasks, a factor pulling in the opposite direction.

Thus, this design provides a different way to assess whether there are circumstances that make it more—or less—likely for individuals to translate metamotivational awareness of task-motivation fit into behavior. In this study we used the same basic stimuli as in Study 3, but changed the target of choice as noted above. Further, in addition to asking participants about their performance expectancies, we also asked them how much they expected to enjoy each task. This allowed us to further examine the factors that may make it more difficult for in-

dividuals to enact metamotivational awareness of task-motivation fit.

## Method

**Participants and design.** Two hundred twenty-eight undergraduates at a large private university in the Northeastern U.S. (198 females, 4 missing) completed the lab-based study in exchange for course credit. Although the study employed a within-participant design, we found that we did not have enough power to detect the effects of interest after collecting data from only 119 participants. We therefore decided to double the sample size and collected data from an additional 109 participants before conducting the final analyses. Prior to analysis, the data from 11 participants were excluded (9 because of computer problems, 1 for not completing one of the task choices, and 1 foreign-language student who expressed confusion about some of the words used in the study). Because the final sample only included 25 males, we did not examine the effects of gender in this study.

**Procedure and materials.** Participants were told that, later in the study, they would be asked to “complete a couple of recall activities.” They were also told that, “before then, we would like [them] to choose skills tasks to perform once [they] finish each of these recall activities.” To make it clear to participants that they should choose the task they expect to perform best on, we told them that their “goal for this study should be to perform as well as possible on whichever skills tasks [they] select.” So, they should “please choose tasks that [they] think [they] will do well on in this context.” Participants were each assigned to perform one promotion-inducing and one prevention-inducing recall activity. The two recall activities were presented at the top of consecutive screens, which were displayed in a random order. Below the description of each activity participants were asked the following: “Considering that you will have just completed this recall activity, which of the following skills tasks would you then like to complete? Remember that your goal is to do as well as possible on whichever task you choose.” Below this, two skills tasks were listed in a random order, one that required eagerness and one that required vigilance. After choosing one of the skills tasks, participants

were asked (on a separate screen) how *successful* they would expect to be (on a scale of 1 [*not at all*] to 8 [*extremely*]) at each of the skills tasks after completing the assigned recall activity. They were then asked (on a separate screen) how enjoyable they think each of the skills tasks would be (on a scale of 1 [*not at all*] to 8 [*extremely*]) after completing the assigned recall activity.

Two sets of recall activities and task choices were used for the study to test whether the effects generalized across task type. Each participant was randomly assigned to view one set. The prevention-inducing recall activity in the first set involved writing about “*your duties and obligations as a child*. In particular, you will be asked to describe the responsibilities you believed you *had* to meet when you were a child.” The corresponding promotion-inducing recall activity in the second set involved writing about “*your hopes and aspirations as a child*. In particular, you will be asked to describe the accomplishments you ideally wanted to meet when you were a child.” The skills tasks that participants were asked to choose from for each of these activities were the same: “A brainstorming task in which you need to be as creative as possible to do well” and “A proofreading task in which you need to be as accurate as possible to do well.”

The prevention-inducing recall activity in the second set involved writing about “*a time in the past when being careful enough helped you avoid getting into trouble*.” The corresponding promotion-inducing recall activity in the first set involved writing about “*a time in the past when you felt you made progress toward being successful in life*.” The skills tasks that participants were asked to choose from for each of these activities were the same: “A creative writing task in which, to do well, you need to imagine a future no one has seen before by seeing possibilities and occasions for advancement” and “An analytic problem solving task in which, to do well, you need to be precise and to make sure that you don’t make a wrong turn in figuring out the right answer.”

Next, to avoid deception, we allowed participants to briefly engage in the recall activities they had selected and the skills tasks to which they had been assigned. This part of the study was treated as a pilot for future experiments. Finally, participants answered some questions

about their prior experience with the skills tasks and then completed a suspicion check and demographics questionnaire.

## Results

**Performance expectancies.** To analyze expectancies, we conducted a 2 (task type: eager vs. vigilant)  $\times$  2 (recall activity type: promotion-inducing vs. prevention inducing)  $\times$  2 (activity set: responsibilities/progress vs. careful/hopes) mixed ANOVA. Activity set was included as a factor so that we could determine whether metamotivational awareness was present for both sets of recall activities/skills tasks. The results of the analysis revealed a marginal main effect of recall activity type,  $F(1, 215) = 3.23, p = .07, \eta_p^2 = .02$ , which was qualified by a significant Task Type  $\times$  Activity Set interaction,  $F(1, 215) = 15.50, p < .001, \eta_p^2 = .07$ . In general, participants expected to do better on both the eagerness and vigilance tasks after writing about their responsibilities than after writing about their progress toward being successful in life,  $t(215) = 4.05, p < .001$ , but they did not expect to do better after writing about being careful not to get in trouble than after writing about their hopes and aspirations,  $t(215) = -1.52, p = .13$ . It appeared that writing about responsibilities/hopes may have been seen as more motivating in general than writing about specific experiences that reflect prevention/promotion concerns (avoiding getting in trouble/making progress).

More importantly, the main effect of recall activity type was qualified by the predicted Recall Activity Type  $\times$  Task Type interaction,  $F(1, 215) = 6.99, p = .009, \eta_p^2 = .03$ . Furthermore, this interaction was not moderated by activity set,  $F(1, 215) = .31, p = .58, \eta_p^2 = .001$ .<sup>8</sup> As shown in Figure 7, participants expected similar levels of success on an eagerness task ( $M = 5.45, SD = 1.44$ ) as on a vigilance task ( $M = 5.26, SD = 1.45$ ) after completing promotion-inducing recall activities prior to task performance,  $t(215) = 1.33, p = .18$ , but expected marginally *less* success on an eagerness task ( $M = 5.36, SD = 1.50$ ) than on a vigilance task ( $M = 5.59, SD = 1.47$ ) after

<sup>8</sup> The expected Recall Activity Type  $\times$  Task Type interaction was also significant when activity set was excluded from the analysis,  $F(1, 216) = 7.02, p = .009, \eta_p^2 = .03$ .

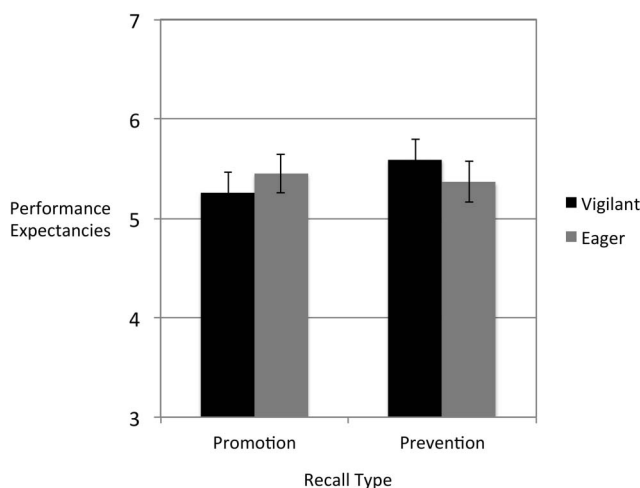


Figure 7. Performance expectancies as a function of recall type and task type (Study 5). Error bars indicate 2 standard errors.

completing prevention-inducing recall activities,  $t(215) = 1.67, p < .10$ . Though the contrasts were not significant in this study, the pattern for performance expectancies replicated our other studies.

**Task choice.** Although the percentage of participants choosing to complete an eagerness task after a promotion-inducing recall activity (50.2%) did not differ from chance, the percentage of participants choosing to complete a vigilance task after completing a prevention-inducing recall activity (59.4%) was significantly above chance (binomial test,  $p = .006$ ). To compare participants' tasks choices for the promotion- and prevention-inducing recall activities, we conducted a related samples McNemar test, which revealed that the percentage of participants who chose to complete a vigilance task after a prevention-inducing recall activity (59.4%) was significantly higher than the percentage of participants who chose to complete a vigilance task after a promotion-inducing recall activity (49.8%),  $p = .04$ . Next, to determine whether the relatively high percentage of participants choosing to complete a vigilance task after a prevention-inducing recall activity was specific to a particular set of materials we examined the effect of activity set ("responsibilities" and "progress" vs. "careful" and "hopes") on this choice. A chi-square test revealed no difference between activity sets,  $\chi^2 = 1.35, p = .25$ .

**Anticipated enjoyment.** Participants' enjoyment ratings were analyzed in the same way as their expectancies. The results of the analysis revealed only a main effect of task type,  $F(1, 215) = 44.19, p < .001, \eta_p^2 = .17$ , such that participants believed they would enjoy engaging in the tasks requiring eagerness more than the tasks requiring vigilance. Thus, participants were more likely to choose a vigilance task than an eagerness task to follow a prevention-inducing recall activity, *despite* the fact that they believed the eagerness task would be more enjoyable.

## Discussion

Study 5 provides some evidence that there are conditions under which individuals may base their behavioral choices on metamotivational awareness of task-motivation fit. Specifically, the pattern of performance expectancies was mirrored in the behavioral choice measure. However, this metamotivational awareness was observed only for vigilance tasks and not for eagerness tasks (as in Study 3). As discussed earlier, this may suggest that participants are more finely tuned to when prevention motivation is more and less relevant. Interestingly, this was the case even though participants believed that they would enjoy engaging in eager tasks more than vigilance tasks overall. It is important to note that this pattern for enjoyment ratings is

not at odds with the performance expectancies pattern or participant awareness of task-motivation fit that may be linked to “feeling right” about what one is doing (Higgins, 2000). As previous research has shown, “feeling right” and “feeling good” are distinct experiences (Avnet, Laufer, & Higgins, 2013; Cesario et al., 2004); our enjoyment measure was not designed to capture the essence of “feeling right.”

Although participants were able to translate performance expectancies into effective behavioral choice, metamotivational awareness of task-motivation fit itself was more limited relative to earlier studies. The patterns were strongest in Studies 1 and 2 in which we could assess performance expectancies over repeated measures with several combinations of tasks and regulatory focus inductions. When we constrained the number of ratings to make the choice consequential, we may have lost power in detecting the effect. In addition, given the many variables that influence the significance of simple effects, it is not necessarily surprising or problematic that every simple effect was not significant in each study (Petty, Fabrigar, Wegener, & Priester, 1996).

In combination with Studies 3 and 4, this study suggests that although the enactment of metamotivational awareness of task-motivation fit is not a given, it can occur given the right situational supports. The choice in this study was structured to reduce the pull of opposing metamotivational beliefs on choice (e.g., the belief that positive arousal always leads to optimal performance), thus facilitating behavioral enactment. However, as noted in the study introduction, such pulls cannot be completely eliminated, creating nontrivial challenges for engaging in effective self-regulatory behaviors. In the general discussion we further elaborate on the dynamics of this process and opportunities for future research.

### General Discussion

The current studies suggest that individuals exhibit some metamotivational awareness of task-motivation fit in the realm of regulatory focus (Studies 1–5) and that this awareness may only get translated into behavior in certain contexts (Studies 3–5). Specifically, participants said they would prefer to perform prevention-inducing recall activities before engaging in

tasks requiring vigilant as opposed to eager processing strategies, but would prefer to perform promotion-inducing recall activities before engaging in tasks requiring eager strategies (Studies 1 and 2). Furthermore, they consistently expected prevention-inducing recall activities and incentives (but not promotion-inducing activities and incentives) to result in better performance on tasks requiring vigilant as opposed to eager processing strategies (Studies 2–5). However, these studies revealed that participants may have also held a competing metamotivational belief—a belief in the utility of being promotion-oriented—such that they generally expected to perform better, regardless of task type, when engaging in activities that induce promotion motivation.

Although previous research has established the benefits of orientation-strategy fit and task-motivation fit as it pertains to regulatory focus (Cesario et al., 2004; Freitas et al., 2002; Higgins, 2000; Higgins et al., 2003), it was unclear whether individuals had any metamotivational awareness of these benefits. The current studies provide evidence both that individuals exhibit at least some awareness of task-motivation fit and that this awareness is in tension with a general pull, at least in North America, toward promotion-inducing activities. In some ways it is remarkable that participants were able to discern such subtleties in the *quality* of regulatory focus motivation that is optimal for a given task demand. For instance, prevention recall activities such as “Recall a time in the past when you were careful not to get on your parents’ nerves” were seen as more appropriate when anticipating tasks that required vigilance versus eagerness, despite being seen as less attractive than the promotion recall activities. Interestingly, participants seemed particularly attuned to the ways in which prevention recall or loss-framed incentives would hurt performance on eager tasks. They did not seem as aware of the ways in which promotion recall or gain-framed incentives could hurt performance on vigilance tasks, though the paradigm used in Study 5 provided some evidence of this awareness. In that study, when participants had to select which tasks they wanted to complete (as opposed to choosing recall activities, like in Studies 1–4), they actually expected to perform better on a vigilant task after completing a prevention-inducing recall activity than after completing a promotion-

inducing recall activity ( $p = .002$ ). Nonetheless, it is possible that this asymmetry in metamotivational knowledge of misfit for eager tasks is more salient within North America, as we discuss further below.

The current studies thus reveal ways in which people have the capability to be attuned to relatively complex motivational contingencies. It is not clear, however, whether individuals would exhibit this type of metamotivational awareness if not being explicitly prompted to make metamotivation judgments. In the current studies, we gave participants explicit promotion and prevention induction options. We do not know whether participants would be able to spontaneously generate or identify promotion or prevention inductions in anticipation of eagerness or vigilance tasks.

The current work also sets the stage for exploring multiple ways in which task-motivation fit may arise in the context of regulatory focus motivation. For instance, prior work has shown that promotion motivation is particularly effective for focusing on the abstract, big picture (Förster & Higgins, 2005) whereas prevention motivation is particularly effective for focusing on concrete details (Semin, Higgins, de Montes, Estourget, & Valencia, 2005). Although we did not directly manipulate the extent to which tasks required abstract versus concrete processing, it will be interesting in future work to examine the array of tasks demands that individuals may or may not monitor when making metamotivational judgments relevant to regulatory focus.

### **The Dynamics of Multiple Metamotivational Beliefs**

Furthermore, across studies we observed that while participants appeared to have some metamotivational awareness of task-motivation fit, this was not the only metamotivational belief at play. Participants also exhibited a preference for promotion inductions and a belief that promotion inductions would result in better performance, regardless of task type. The implications of this tension were especially evident in Studies 3–5, which assessed behavioral choice. In Studies 3 and 4, participants showed an overwhelming main effect choice of the promotion inducing activities, regardless of which task they were anticipating. In Study 5 we changed the structure of the behavioral choice, revealing

some evidence for effective behavioral enactment of metamotivational awareness of task-motivation fit. This tension between metamotivational awareness of task-motivation fit and endorsement of promotion inductions as an “all-purpose” way to motivate raises important questions for future research about the factors that both facilitate and hinder metamotivational control of task-motivation fit. Below we discuss some possible directions for investigating these questions based on hints gleaned from the present studies.

Across Studies 1–4 we observed that our North American participants preferred (both in their ratings and their choices) recall activities and incentive structures that induced a promotion-oriented regulatory state. We believe that this main effect offers some general insights into factors that influence participants’ beliefs about how best to regulate their own motivation. As noted earlier, one possibility is that the general preference for promotion (rather than prevention) inductions may reflect the general cultural context (North America is a predominantly promotion-oriented culture; Higgins, 2008), the hedonic pull of a positive, high arousal state like eagerness (cf. Ford & Tamir, 2012), and/or the belief that the relatively high levels of positive arousal or enjoyment associated with a promotion orientation lead to optimal performance. Although speculative, this pattern of preferences suggests that one of the factors likely to disrupt metamotivational control of task-motivation fit is the familiarity or hedonic value of the motivational state or strategy. Cross-cultural work could shed light on this speculation by examining whether cultures that are predominantly prevention-oriented (e.g., Japan) show a parallel main effect preference for prevention-oriented inductions.

Another way to interpret the general preference for promotion-inducing activities is that individuals generally believe that *any* type of motivation will work for vigilant tasks. It may even be that individuals believe it is useful to activate all motivational “tools” in one’s toolkit in the service of being thorough and careful. We are currently exploring how knowledge of specific task demands and lay beliefs about the effectiveness of particular motivations may help to explain these dynamics.

## Antecedents of Metamotivational Awareness and Control

The current studies are silent on how effective metamotivational awareness and control develop. Understanding the development of metamotivation is important not only for an appreciation of the type of developmental trajectory that may be particularly adaptive in this regard, but also as a basis for developing interventions. Research on the development of metacognition suggests that children can acquire metacognitive knowledge and skills through observational learning and through the feedback they generate or receive while practicing these skills (Baker, 1994; Lin, 2001). Thus, it is possible that metamotivational awareness and control can be fostered by modeling techniques for inducing particular motivations and then providing children (or adults) with opportunities to successfully implement these techniques on their own, as well as calling their attention to cases in which induction of particular motivation led to enhanced task performance.

Within the regulatory focus literature, there is research supporting the idea that particular caretaker styles are associated with the development of a stronger prevention or promotion regulatory system, respectively (Higgins, 1997; Keller, 2008; Manian, Papadakis, Strauman, & Essex, 2006). For instance, caretaker interactions that emphasize the presence and absence of positive outcomes (e.g., the giving and withholding of support and encouragement) are likely to strengthen the development of the promotion system. Caretaker interactions that emphasize the absence and presence of negative outcomes (e.g., the administration and withdrawal of punishment or criticism) are likely to strengthen the development of the prevention system. However, we do not know what type of caretaking style facilitates the development of the awareness that promotion motivation is optimal in some circumstances, whereas prevention motivation is optimal in others. It is possible that individuals who develop this type of metamotivational awareness have had two different caretakers with two distinct caretaking styles (e.g., one promotion-oriented parent, one prevention-oriented parent). It may also be that the systems must be strengthened in conjunction with one or more caretakers who model the benefits of flexible shifting.

Another important possibility is that the effectiveness of modeling flexible metamotivational regulation depends in part on individual differences in the learner's cognitive or self-regulatory skills. Executive function (EF) ability—a collection of control processes that regulate cognition and action (e.g., Miyake et al., 2000)—is one likely candidate. Although sometimes measured as a unitary function, three individual EF functions that have received significant attention in the literature are inhibition (intentionally overriding dominant responses), updating (frequently “refreshing” working memory), and cognitive flexibility (switching between cognitive sets). Given that accurate metamotivation involves flexibly shifting one's motivation based on task demands, the capacity for cognitive flexibility may predict a capacity for motivational flexibility. Inhibition may also be a critical component of accurate metamotivation, to the extent that individuals need to inhibit a dominant response to meet a new motivational challenge. General differences in self-regulatory skill may also be captured by broad trait-like individual difference measure (e.g., grit, Duckworth & Quinn, 2009; trait self-control, Tangney, Baumeister, & Boone, 2004) known to predict self-regulatory success.

## Consequences of Accurate Metamotivation and Concluding Thoughts

Although the current studies suggest that individuals have some metamotivational awareness of task-motivation fit in the realm of regulatory focus, it is not clear what the downstream consequences of accurate metamotivation are. Examining how accurate metamotivation influences proximal outcomes (e.g., task performance) and more distal outcomes such as well-being and life satisfaction is also important for future research. It will also be interesting to examine whether individuals who exhibit accurate metamotivation in the realm of regulatory focus task-motivation fit also exhibit it in others. As noted in the introduction, the present studies were an initial investigation into *one type* of metamotivation. The results provide a starting point for investigating metamotivation (task-motivation fit and beyond) in other arenas, but are certainly not a definitive and comprehensive answer on what all metamotivation looks like.

Investigating metamotivational awareness in other areas will also permit an exploration of how domain-specific or domain-general this type of metamotivation truly is. For instance, just as we know that a promotion-oriented state is beneficial when working on a brainstorming task (but not a vigilance task), we know that both intrinsic and extrinsic motivation can be beneficial, depending on task constraints or how learning is assessed (see Sansone & Thoman, 2005). Similarly, we know that high-level (i.e., more abstract) construals are generally beneficial when approaching a self-control conflict (Fujita, Trope, Liberman, & Levin-Sagi, 2006) but not when performance is facilitated by immersion in the concrete details of the immediate context (Schmeichel, Vohs, & Duke, 2011). Indeed, in the seminal work on delay-of-gratification in children, Mischel and colleagues observed that children who understood the benefits of abstraction were better able to wait for delayed, larger rewards (Mischel & Mischel, 1983; Mischel & Baker, 1975). However, that work did not examine the extent to which children understood the situations in which it is better to be more abstract or concrete, or even the situations in which it may be better to indulge versus delay (e.g., Funder, Block, & Block, 1983). Exploring these kinds of issues across multiple domains will allow examination of what factors predict the likelihood that individuals have one or multiple types of metamotivational knowledge (e.g., is the type of person who exhibits metamotivational awareness with regard to promotion/prevention orientations the same type of person who exhibits metamotivational awareness with regards to intrinsic/extrinsic motivation?). Ultimately, an increased understanding of metamotivation will provide insights into how individuals are able to be flexible and effective in pursuit of their goals.

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## Appendix

### Materials for Studies 1 and 2

#### Promotion Recall Activities (Studies 1 and 2)

1. Please write about your hopes and aspirations as a child. What accomplishments did you ideally want to meet when you were a child?

2. Please write about a time in the past when trying to achieve something important to you, you performed as well as you would like to do.

3. Please write about a time in the past when compared with most people you were able to get what you wanted out of life.

4. Please write about a time in the past when you felt you made progress toward being successful in life.

#### Prevention Recall Activities (Studies 1 and 2)

1. Please write about a time in the past when being careful enough avoided getting you into trouble.

2. Please write about a time in the past when you stopped yourself from acting in a way that your parents would have considered objectionable.

3. Please write about a time in the past when you were careful not to get on your parents' nerves.

4. Please write about your duties and obligations as a child. What responsibilities did you think you ought to meet when you were a child?

#### Neutral Recall Activities

1. Please describe how you got to school today (Study 1).

2. Please describe the last time you traveled on an airplane (Study 1).

3. Please describe what your kitchen looked like when you were a child (Studies 1 and 2).

4. Please describe the physical layout of the most recent restaurant you visited (Studies 1 and 2).

5. Please describe the various floor surfaces in your home (Study 2).

6. Please describe the inside of the last bus on which you traveled (Study 2).

#### Eagerness Task Descriptions (Studies 1 and 2)

1. Your goal is to be as creative as possible by seizing opportunities to take the ordinary and innovate.

2. Your goal is to imagine a future no one has seen before by seeing possibilities and occasions for advancement.

#### Vigilance Task Descriptions (Studies 1 and 2)

1. Your goal is to be as accurate as possible by making sure to avoid lurking errors and pitfalls.

2. Your goal is to be precise and make sure you don't make a wrong turn in figuring out the right next step.

Received October 17, 2016

Revision received December 5, 2016

Accepted December 15, 2016 ■