

How Regulatory Focus Impacts Knowledge Accessibility

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ABSTRACT

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The current research applies Regulatory Focus Theory (Higgins, 1997) and a new framework for knowledge accessibility called Relevance of a Representation (Eitam & Higgins, 2010) to examine how the strength of promotion ideal goals (i.e. one's hopes and aspirations) and the strength of prevention ought goals (i.e. duties and responsibilities) can predict the accessibility of one's knowledge representations. It is proposed that strong promotion ideal goals will lead to the activation of knowledge representations presented as the potential for gain/non-gain, whereas strong prevention ought goals will lead to the activation of knowledge representations presented as the potential for non-loss/loss. Three studies examining these proposals are reported. Study 1a measured the chronic strength of participants' promotion ideal goals and prevention ought goals using an established questionnaire. Studies 1b and 2 experimentally manipulated the momentary strength of participants' promotion ideal goals or prevention ought goals by having participants write a brief essay that primed their ideals or their oughts. In all three studies, participants completed a synonym task. Half the synonym problems were presented as the potential to gain points for correct answers and not to gain points for incorrect answers; the other half were presented as the potential not to lose points for correct answers and to lose points for incorrect answers. Following the synonym task, participants completed a lexical decision task measuring accessibility (i.e. were asked to identify as quickly as possible whether a string of letters formed a word or

not). Some of the letter strings were the target words from the synonym task and the other strings were not. Response latencies on the lexical decision task were used as a measure of accessibility. As predicted, all three studies found that, for participants with stronger promotion ideal goals, knowledge representations framed as the potential for gain/non-gain were more accessible than those framed as the potential for non-loss/loss. The relation between stronger prevention ought goals and knowledge accessibility was more complex. Study 1b found that both gain/non-gain and non-loss/loss framed synonyms were more accessible when the participants' had stronger prevention ought goals. Study 2, however, found that when participants were given feedback indicating that they were significantly exceeding the synonym task goal, then only non-loss/loss framed synonyms, as predicted, were more accessible. Implications of these findings for memory and learning processes are discussed.

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Dedication

In honor of my wife, Agnieszka Demczuk Rodriguez, who makes every day of my life incredibly wonderful.

and

In honor of my parents, Amado and Josie Rodriguez, whose love has been, and will always be, the foundation on which all of my accomplishments are built.

and

In loving memory of Joel Salas Jr., a truly great friend, cousin, and person who brought joy to the lives of everyone he knew.

Chapter 1: Introduction

Imagine two students in a class you are teaching. One student believes that getting an education is an exciting opportunity to expand his/her knowledge and eagerly seeks out every opportunity for advancement so s/he can do well in your class. The other student believes that getting an education is an important responsibility and is vigilant against anything that would prevent him/her from fulfilling that responsibility. Both students are highly motivated and deserve to be successful, but there are significant differences in the ways they pursue success. How will these differences influence the way the students think, learn and process information? As their teacher, what can you do to facilitate their success?

Most educators have experience working with students like the ones mentioned in the scenario above. Inquiry about how these differences will influence student learning represents a recent, significant shift in the development of motivation science. In the above scenario, both students are highly motivated and are pursuing the same goal of academic success. That is, if one were to ask *whether* the students are motivated, or *what* they are motivated to accomplish, the answer would be the same for both. Instead, what differs is the manner in which the students engage in the pursuit of their goal. What differs is *how* the students are motivated.

Neither student's motivation is inherently good or bad, but there is a growing body of research that demonstrates that the differences in their motivation will interact with their classroom environment to significantly influence the way they think, learn, respond to feedback, and value what they have learned. Therefore, developing our

scientific understanding of how these differences interact with the classroom environment will provide us with valuable knowledge about ways we can facilitate student success.

The differences between the students' motivation in the scenario mentioned above are examples of what Higgins (1997) described as differences in regulatory focus. Regulatory focus theory (1997) posits that self-regulation toward nurturance needs is fundamentally different than self-regulation toward security needs. A promotion focus is activated by nurturance needs, strong ideals and gain/non-gain situations, and leads to sensitivity to the presence or absence of positive outcomes and to approaching matches to desired outcomes and mismatches to undesired outcomes. Higgins defines ideals as hopes, wishes, or aspirations (1997). Thus, the eager student excited to expand his/her knowledge is an example of a promotion focus.

In contrast, a prevention focus is activated by security needs, strong oughts and non-loss/loss situations and leads to sensitivity to the presence or absence of negative outcomes and to avoiding mismatches to desired outcomes and matches to undesired outcomes. Higgins defines oughts as duties, responsibilities or obligations (1997). Thus, the vigilant student ensuring s/he fulfills his/her responsibility to be educated is an example of a prevention focus.

Regulatory focus theory allows us to begin to understand how the differences in the students' motivation will influence how the students will process information. However, this understanding can be even further advanced by also applying a new framework developed by Eitam and Higgins (2010). Eitam and Higgins have proposed relevance of a representation (ROAR) as a framework for determining whether and when a mental representation will be accessible. That is, the ROAR framework is designed to

elucidate when a stimulated mental representation will continue to influence thought, judgment and/or actions. ROAR specifies that motivational relevance is a primary determinant as to whether and when a mental representation will continue to have these kinds of accessibility effects.

Regulatory focus theory clearly describes what is motivationally relevant to each regulatory focus. Therefore, by combining regulatory focus theory and ROAR, we can begin to make clear predictions about which aspects will influence whether and when knowledge representations will be accessible in students' minds. Situations with the potential for gain or non-gain are motivationally relevant to a promotion focus; situations with the potential for non-loss or loss are motivationally relevant to a prevention focus. This leads to the conclusion that knowledge representations associated with gain/non-gain will be accessible for a promotion focus and that knowledge representations associated with non-loss/loss will be accessible for a prevention focus.

Overview

The present thesis is designed to examine these predictions directly. That is, I examine how regulatory focus influences the accessibility of representations that were presented either as the potential for gain/non-gain or as the potential for non-loss/loss. In Chapter 2, I review the literature on regulatory focus theory and ROAR. From this review, it becomes clear that regulatory focus should interact with gain/non-gain versus non-loss/loss framing to influence knowledge accessibility. Chapters 3 and 4 present three experimental studies which directly examine how regulatory focus and gain/non-

gain versus non-loss/loss framing interact to influence the accessibility of task related knowledge representations.

The experimental studies measured participants' chronic strength of promotion ideal goals and prevention ought goals (Study 1a) or experimentally manipulated the momentary strength of participants' promotion ideal goals or prevention ought goals (Studies 1b and 2). Participants then solved several synonym problems. Participants were instructed, "*Select the synonym which most closely matches the meaning of the given word.*" Half of the synonym problems were presented as the potential to gain points for a correct answer or not gain points for an incorrect answer (gain/non-gain); the other half of the synonym problems were presented as the potential to avoid losing points for a correct answer or to lose points for an incorrect answer (non-loss/loss). All participants were also told that, "*Successful participants are able to score in the top 30%.*"

Actually, all of the choices were synonyms, but the synonym problems were constructed to make it seem that some answers were better than others. For example, participants were presented with the word *pitch* and the choices, *spiel*, *note*, *raise*, *toss*, and *tilt*. Constructing the synonym problems in this way allows for greater experimental control over how the participants think they are doing. In order for all participants to believe they successfully completed the goal, all participants were told that they performed in the top 30% regardless of which synonyms they actually selected.

After participants finished the synonym task, they were asked to identify as quickly as possible whether different strings of letters formed real or nonsense words (i.e. a lexical decision task). Some of the letter strings were actually the words for which the participants were supposed to find synonyms. The time taken to respond as to whether

each string of letters was a word was measured. A faster response indicates that the particular word is more accessible. Therefore, participants with strong promotion ideal goals should have responded more quickly to words that had been framed as gain/non-gain compared to words that had been framed as non-loss/loss, whereas participants with strong prevention ought goals should have responded more quickly to words that had been framed as non-loss/loss compared to words that had been framed as gain/non-gain.

In addition to examining the interaction of regulatory focus and framing, Study 2 extended Studies 1a and 1b by examining how feedback given during the synonym task interacts with regulatory focus and framing to influence knowledge accessibility. Specifically, participants were either told they were performing in the top 28% or the top 5% at midpoint in the goal pursuit process. Because performing in the top 5% at midpoint would be substantially above the stated goal, participants in this condition should be even more sensitive to focus-consistent framing. This is because once success is virtually guaranteed, participants with strong prevention ought goals should only need to focus on maintaining their performance by preventing loss.

The data collected from these studies contributes to the understanding of both regulatory focus and knowledge accessibility. First, these data provide additional evidence that, as ROAR (Eitam & Higgins, 2010) posits, motivational relevance is a determinant of knowledge accessibility. Furthermore, these data demonstrate that regulatory focus influences motivational relevance.

Second, these data expand upon some of the distinctions in regulatory focus theory (Higgins, 1997). For example, regulatory focus theory posits differences in the *sensitivity* to the presence of positive or negative stimuli. However, regulatory focus

theory allows for additional distinctions as to whether “sensitivity” pertains to *whether* the knowledge is accessible and/or to *how* the knowledge has influence. By utilizing an implicit measure of accessibility (the lexical decision task), the present studies provide evidence which suggest that regulatory focus does, in fact, influence *whether* focus-consistent knowledge is accessible.

Utilizing an implicit measure of accessibility is advantageous because there already have been studies which used explicit measures (e.g. Higgins, Roney, Crowe & Hymes, 1994). Furthermore, it is possible that differences that have been found utilizing explicit measures of accessibility may have resulted from preferences by the participants to report the specific content and not only from differences in the accessibility of that content. That is, the content may have been accessible, but the participants may have chosen not to report it. Utilizing an implicit measure prevents this potential source of confounding.

Third, while there have been other studies which found that regulatory focus can influence memory for focus-consistent information (e.g. Higgins et al., 1994), the present studies significantly extend those findings because the present studies experimentally manipulate (through framing) whether stimuli are relevant to a particular regulatory focus. Previous studies used *different* stimuli to examine whether the stimuli were relevant to a particular regulatory focus. Importantly and unlike previous studies, the present studies counterbalanced the stimuli by framing, and thus demonstrated that framing can influence motivational relevance and the accessibility of the *same* stimuli even beyond the influence of the specific stimuli.

Furthermore, the present studies demonstrated some additional distinctive characteristics in the tactical preferences of a prevention focus versus a promotion focus. This is because the present studies counterbalanced by framing and randomized the order of the presentation of the stimuli, which allowed for some *within-subject* comparisons that have not been possible in previous studies.

Chapter 2: Literature Review

All organisms influence, and are influenced by, their environment. From its beginning, psychology has examined the influence of the environment on behavior and the mind. A rich literature has resulted, and there is substantial evidence that the environment can have a profound influence on judgment, thought, behavior, physiological responses, and well-being. Furthermore, there is extensive evidence that environmental stimuli can influence the mind even when individuals are not consciously aware that the environment is affecting them.

However, not all elements or forces in the environment are of equal consequence, nor is their influence pervasive. People are exposed to an infinite amount of information in any given moment, but only some of that information actually influences the individual. Sometimes this can occur because of the finite capacity for the mind to process information. Other times, this can occur because of the influence of prior environmental stimuli, the specific characteristics of different representations, and/or because of individual differences. Therefore, as Eitam and Higgins (2010, p. 951) note, a fundamental question in psychology is, “When will something in our external environment influence our consequent judgment, thought and action?”

Eitam and Higgins (2010) propose relevance of a representation (ROAR) as a framework to address this question. Though its application does not necessarily need to be limited to the experimental paradigm of priming, the ROAR framework is primarily based on empirical studies that use the experimental paradigm called priming. Priming is generally understood as the experimental practice of presenting a stimuli, making sure

participants process the stimuli, and then testing how the stimuli influences the participants (Eitam & Higgins, 2010). Since early studies in cognitive psychology (Meyer & Schvaneveldt, 1971; Segal, 1967) and social psychology (Higgins, Rholes, & Jones, 1977), the literature on priming has become so extensive and convincing that Förster, Liberman, and Friedman (2009, p. 173) have stated, "...it seems that nothing is left that cannot be primed." Therefore, developing a deeper understanding of when priming will actively influence the thoughts and actions of individuals is particularly important.

Central to the ROAR framework are the concepts of accessibility, applicability and activation (for more general reviews of research regarding accessibility, applicability and activation see Bargh & Chartrand, 2000; Higgins, 1989, 1996; Sedikides & Skowronski, 1991; Wyer & Srull, 1986, 1989). Accessibility has been generally conceived to refer to the amount of stimulation required for a concept that is available in the mind to become active in the mind, and activation has been conceived to refer to concepts that have been accessed for use (Bruner, 1957; Higgins, 1996). Applicability has referred to the degree to which features of a specific representation overlap with a particular target stimulus, and increased overlap would result in increased likelihood of activation (Higgins, 1996).

Unlike earlier models of knowledge accessibility which generally assume that representations will automatically influence thought if individuals process the stimuli and which focused primarily on frequency, recency (e.g. Higgins, Bargh, & Lombardi, 1985; Higgins & Brendl, 1995; Wyer & Srull, 1986, 1989) and applicability (Higgins, 1996) as determinants of the accessibility, ROAR argues that merely processing the stimuli may not necessarily lead to the stimuli remaining accessible (Eitam & Higgins, 2010). More

specifically, ROAR argues that just because a representation has been used does not necessarily mean that the representation will remain accessible to influence thought and action processes.

Instead, ROAR posits that motivational relevance is a primary determinant as to whether and when a mental representation will remain accessible to influence thought and action processes. Furthermore, according to ROAR, motivational relevance is determined by people wanting to be effective in value, truth, and control (Higgins, in press). That is, ROAR specifies that representations that are perceived to be high in value, truth, and/or control effectiveness are more likely to remain accessible and have influence. Higgins (in press) defines value effectiveness as *having what is desired*, truth effectiveness as *establishing what is real*, and control effectiveness as *managing what happens*.

Consistent with the ROAR framework, one long-known source of motivational relevance is goal relevance. Zeigarnik (1927/1938) found that memory for uncompleted tasks tends to be superior to memory for completed tasks (for a review of many studies on the Zeigarnik effect, see Butterfield, 1964). Förster, Liberman & Higgins (2005) demonstrated that accessibility of goal related concepts increased prior to goal completion and decreased after goal completion. Shah, Friedman, and Kruglanski (2002) demonstrated that activation of a focal goal inhibited the accessibility of alternative goals. Importantly and in support of ROAR, Ferguson and Bargh (2004) have demonstrated that individuals engaged in goal pursuit evaluate goal-related objects as more positive than goal-irrelevant objects, which supports the notion that goals influence value which, in turn, influences motivational relevance.

It is important to note, however, that goals do not always influence knowledge accessibility. Instead, there is evidence which suggests that goals only influence knowledge accessibility if the goals themselves are valued (cf. Custers & Aarts, 2005, 2007; Ferguson 2007, 2008; Förster et al., 2005, Studies 5 & 6).

Therefore, the empirical studies which have examined goals provide strong support for the main tenets of ROAR. It has been shown in the literature that goals influence the value of goal-related objects. ROAR states that value should influence the motivational relevance of those objects, and ROAR also states that motivational relevance should determine accessibility. Thus, goals should influence the motivational relevance and accessibility of goal-related objects. Many studies, in fact, have found that goals can influence the accessibility of goal-related objects. Moreover, the increased accessibility of the goal-related objects has been found to continue as long as the goal is active and may decay after the goal is completed. However, consistent with ROAR, studies have also found that increased accessibility of goal-related objects only occurs if the goal itself is valued.

The ROAR in Regulatory Focus

Though goals provide strong support for ROAR, goals are not the only source of motivational relevance. Another source of motivational relevance is regulatory-focus goal orientation. Regulatory focus has been shown to have a significant influence on cognition, emotion, and motivation (for reviews see Förster, & Werth, 2009; Higgins, 1997; Higgins & Spiegel, 2004; Molden, Lee, & Higgins, 2008). It has been shown to influence risk seeking (Scholer, Stroessner & Higgins, 2008; Scholer, Zou, Fujita,

Stroessner & Higgins, 2010), persistence (Förster, Grant, Idson, & Higgins, 2001; Förster, Higgins, Idson 1998), performance (Shah, Higgins, & Friedman, 1998), memory (Higgins, Roney, Crowe, & Hymes, 1994), creativity (Baas, Dreu, & Nijstad, 2008; Friedman & Förster, 2001), analytical thinking (Friedman & Förster, 2005), perception (Förster & Higgins, 2005), affective response (Higgins, Shah, & Friedman, 1997), expectancy (Förster, Grant, Idson, & Higgins, 2001), valuation (Brodscholl, Kober & Higgins, 2007), categorization (Crowe & Higgins, 1997; Molden & Higgins, 2004), negotiation (Appelt & Higgins, 2010; Appelt, Zou, Arora, & Higgins, 2009), and accuracy (Förster, Higgins, & Bianco, 2003).

Reviewing regulatory focus theory (Higgins, 1997) with the intent of applying the ROAR framework (Eitam & Higgins, 2010), it is clear how and why regulatory focus should influence knowledge accessibility. The reason regulatory focus should influence knowledge accessibility is the fact that both regulatory focus orientations are directly related to value because both pertain to having what is desired (and not having what is undesired). Because ROAR states that one determinant of motivational relevance is value and that value is defined as having what is desired, the fact that regulatory focus inherently pertains to value means that regulatory focus should influence motivational relevance which, in turn, should influence knowledge accessibility.

Given that the ROAR framework clearly suggests that regulatory focus should influence knowledge accessibility, the next step is to determine exactly how each regulatory focus orientation should influence knowledge accessibility. As stated in the introduction, a promotion focus is activated by nurturance needs, strong ideals and gain/non-gain situations, and leads to sensitivity to the presence or absence of positive

outcomes and to approaching matches to desired outcomes and mismatches to undesired outcomes. Therefore, a promotion focus should lead to the increased accessibility of knowledge representations that are associated with the presence or absence of positive outcomes (i.e. gain/non-gain outcomes), and to the increased accessibility of representations associated with approaching matches to desired endstates or approaching mismatches to undesired endstates.

In contrast, a prevention focus is activated by security needs, strong oughts and non-loss/loss situations and leads to sensitivity to the presence or absence of negative outcomes and to avoiding mismatches to desired outcomes and matches to undesired outcomes. Therefore, a prevention focus should lead to the increased accessibility of knowledge representations that are associated with the presence or absence of undesired outcomes (i.e. loss/non-loss outcomes), and to the increased accessibility of knowledge representations associated with avoiding mismatches to desired endstates or avoiding matches to undesired endstates.

Reviewing the literature on regulatory focus, one study which supports the ROAR framework is a study that was conducted by Higgins, et al. (1994, Study 2). In this study, regulatory focus was induced by having participants randomly assigned to write either a brief essay about how their hopes and aspirations had changed from when they were a child (promotion), or an essay about how their duties and obligations had changed from when they were a child (prevention). Participants were then told that because the first task was so short, they would also be completing an unrelated study in which they would be reading about four days in the life of a student. The story that participants read had 16 episodes that occurred over the four days. Eight of the episodes were constructed to be

relevant to promotion by having four episodes presented as approaching matches to desired endstates and four episodes presented as approaching mismatches to undesired endstates. The other eight episodes were constructed to be relevant to prevention by having four episodes presented as avoiding mismatches to desired endstates and four episodes presented as avoiding matches to undesired endstates. After reading the story, participants were given a distractor task in which they were instructed to copy shapes for seven minutes. Following the distractor task, participants were asked to write down as many episodes from the story as they could and to be as precise as possible.

Higgins et al. (1994) found that priming participants' promotion ideal goals by writing the promotion essay at the beginning of the experiment caused them to recall more of the episodes that were presented as *approaching* matches to desired endstates or *approaching* mismatches to undesired endstates. Higgins et al. (1994) also found that priming participants' prevention ought goals by writing the prevention essay at the beginning caused them to recall more of the episodes that were presented as *avoiding* mismatches to desired endstates and *avoiding* matches to undesired endstates. Because knowledge accessibility should influence recall, these results imply that manipulating participants' regulatory focus by having them write the essay influenced the motivational relevance and, therefore, the knowledge accessibility of the episodes in the story about the student.

Regulatory Focus and the Motivational Relevance of Items Framed as Gain/Non-gain versus Non-loss/Loss

Combining regulatory focus theory and ROAR, it also becomes apparent that regulatory focus should especially influence knowledge accessibility in conditions of regulatory fit (Higgins, 2000; 2005). Regulatory fit is defined as a match between the manner of goal pursuit and the regulatory orientation of the individual pursuing the goal. Importantly, regulatory fit has been shown to influence motivational strength (Förster, Grant, Idson, & Higgins, 2001; Förster, Higgins, & Idson, 1998; Idson, Liberman, & Higgins, 2004; Shah, Higgins, & Friedman, 1998; Spiegel, Grant-Pillow, & Higgins, 2004). Furthermore, regulatory fit has also been shown to influence value (Avnet & Higgins, 2003; Brodscholl, Kober & Higgins, 2007; Higgins, Idson, Freitas, Spiegel, & Molden, 2003).

One factor that has been clearly demonstrated to influence regulatory fit for regulatory focus orientations is the framing of task items as either the potential for gain/non-gain or non-loss/loss (Förster, Grant, Idson, & Higgins, 2001; Förster, Higgins, & Idson, 1998, Shah, et al., 1998). For example, Shah et al. (1998, Study 2) used an anagram task to examine how regulatory focus and framing can influence motivation and performance. Participants were told that, in order to receive the maximum payment for their performance, they would need to score four points on the anagram task. Furthermore, participants were told that, for each green anagram, they would gain a point if they found all of the possible solutions but would not gain a point if they did not find all of the possible solutions (gain/non-gain framing). Participants were also told that, for each red anagram, they would not lose a point if they found all of the possible solutions but would lose a point if they did not find all of the possible solutions (non-loss/loss framing). Chronic regulatory focus was measured with the regulatory focus strength

measure that was developed by Higgins, Shah and Friedman (1997). Performance was calculated by summing the total number of correct anagram solutions for each participant. Motivation was measured by how long participants persisted on each anagram. Shah et al. (1998) found that strong promotion ideal goals predicted better performance and increased persistence on the green (gain/non-gain) anagrams. They also found that strong prevention ought goals predicted better performance and increased persistence on the red (non-loss/loss) anagrams.

Förster et al. (1998, Study3) further examined how regulatory focus and gain/non-gain versus non-loss/loss framing interact to influence motivation. Like Shah et al. (1998), Förster et al. (1998) used an anagram task where half of the anagrams were framed as the potential to gain or not gain points while the other half of the anagrams were framed as the potential to not lose points or lose points. Chronic regulatory focus was measured by the regulatory focus strength measure (Higgins et al., 1997). Regulatory focus was also experimentally manipulated by telling some participants that they would receive an extra dollar if they performed at or above the 70th percentile (promotion framing) and telling the other participants that they would lose a dollar if they did not perform at or above the 70th percentile (prevention framing). Persistence on the anagrams was used as the measure of motivation. Consistent with Shah et al. (1998), Förster et al. (1998) found that strong promotion ideal goals predicted increased persistence on gain/non-gain anagrams, and that strong prevention ought goals predicted increased persistence on non-loss/loss anagrams. Additionally, Förster et al. (1998) found that manipulating regulatory focus through promotion framing increased persistence on

the gain/non-gain anagrams, whereas manipulating regulatory focus through prevention framing increased persistence on the non-loss/loss anagrams.

Förster et al. (2001, Study 2) examined how success versus failure feedback can interact with regulatory focus and framing to influence motivation. Like Shah et al. (1998) and Förster et al. (1998), in Study 2 of Förster et al. (2001) participants completed an anagram task where half of the anagrams were framed as the potential to gain or not gain points while the other half were framed as the potential not to lose or lose points. However, after completing half of the anagrams, participants were either given success or failure feedback. Participants given success feedback were told that they were performing at the 79th percentile which was above the stated goal of performing at or above the 70th percentile. Participants given failure feedback were told that they were performing at the 61st percentile which was below the stated goal of performing at or above the 70th percentile. As in the previous studies, persistence was used as the measure of motivation. Regulatory focus was experimentally induced using the same type of framing that was used in Förster et al. (1998).

Förster et al. (2001) again found that a promotion focus predicted increased persistence on gain/non-gain framed anagrams, whereas a prevention focus predicted increased persistence on non-loss/loss framed anagrams. Furthermore, feedback increased these effects. Specifically, Förster et al. (2001) found that when given success feedback at the midpoint, promotion focused participants persisted longer on gain/non-gain anagrams than prevention focused participants. However, when given failure feedback at the midpoint, prevention focused participants persisted longer on non-loss/loss anagrams than promotion focused participants.

Though the studies conducted by Shah et al. (1998) and Förster et al. (1998, 2001) demonstrate that a promotion focus increases motivation on anagrams framed as a potential for gain/non-gain, and that a prevention focus increases motivation on anagrams framed as a potential for non-loss/loss, it is important to note that all of the comparisons that were analyzed in these studies were between-subjects comparisons. The studies did not compare the motivational effects of gain/non-gain versus non-loss/loss anagrams within each regulatory focus. This is especially important to note when considering the effect of midpoint feedback in Förster et al. (2001). Though in Förster et al. (2001) participants in a prevention focus persisted longer on non-loss/loss anagrams than promotion focused participants, the difference in persistence between gain/non-gain and non-loss/loss was greatest for prevention focused participants after success feedback. This finding suggests the possibility that, when given failure feedback at midpoint, participants in a prevention focus may have adopted tactics which caused both items framed as gain/non-gain and items framed as non-loss/loss to be motivationally relevant. However, since this finding was not the focus of Förster et al. (2001), they did not test the statistical significance of this difference.

Summary

The purpose of the present research is to develop an understanding of how regulatory focus (Higgins, 1997) can influence knowledge accessibility. The ROAR framework states that motivational relevance is a primary determinant of when a representation will actively influence thought and action, and that motivational relevance is determined by the value, truth, and/or control effectiveness of the representation (Eitam

& Higgins, 2010). Given that regulatory focus is directly related to value, it is proposed that regulatory focus should influence knowledge accessibility, and there is evidence to support this proposal (e.g. Higgins et al., 1994). Furthermore, based on several studies (e.g. Shah et. al, 1998; Förster et al. 1998, 2001), which have found that regulatory fit (Higgins, 2000, 2005) increases motivation and value, it is further proposed that presenting task items as a potential for gain/non-gain will lead to the increased accessibility of those task items for individuals in a promotion focus, and that presenting task items as a potential for non-loss/loss will lead to the increased accessibility of those items for individuals in a prevention focus. Based on the present review of the literature, it is also noted that the influence of the interaction of feedback and regulatory focus on motivational relevance and knowledge accessibility has not been entirely clarified.

Chapter 3: Studies 1a and 1b

The empirical studies cited in the literature review suggest that framing task items as the potential for gain/non-gain versus framing items as the potential for non-loss/loss should interact with regulatory focus to influence the accessibility of the knowledge representations associated with the task items. Specifically, task items framed as the potential for gain/non-gain should be more accessible in a promotion focus because situations with the potential for gain/non-gain are motivationally relevant in a promotion focus. Furthermore, task items framed as the potential for non-loss/loss should be more accessible in a prevention focus because situations with the potential for non-loss/loss are motivationally relevant in a prevention focus. The present studies were designed to test these hypotheses directly.

Study 1a examines how the interaction of gain/non-gain versus non-loss/loss framing with chronic regulatory focus strength influences knowledge accessibility. Chronic regulatory focus strength was measured using the regulatory focus strength measure (see Higgins, Shah & Friedman, 1997) in which response latencies for listing promotion ideal goals and prevention ought goals were collected. Faster response latencies for listing promotion ideal goals indicate higher accessibility and strength of the promotion ideal goals; faster response latencies for listing prevention ought goals indicate higher accessibility and strength of the prevention ought goals.

Framing was manipulated on a synonym task. The idea of using a synonym task was inspired by a similar paradigm used by Rothermund (2003). For the synonym task used in the present research, participants were asked to, “*Select the synonym which most*

closely matches the meaning of the given word.” Half of the synonyms items were presented as the potential to gain points for correct answers and the potential to not gain points for incorrect answers (gain/non-gain framing). The other half of the synonym items were presented as the potential to avoid losing points by selecting the correct answer, and the potential to lose points for not selecting the correct answer (non-loss/loss framing).

After the synonym task, participants completed a lexical decision task where they were asked to indicate as quickly as possible whether a string of letters was a word or not. Some of the words in the lexical decision task were the target words from the synonym task, and the others were not. Faster response latencies on the lexical decision task would indicate a higher accessibility.

Study 1b is virtually identical to Study 1a except that it examined the interaction of framing and regulatory focus that was experimentally manipulated by using a procedure developed by Higgins, Roney, Crowe, and Hymes (1994). Regulatory focus was primed by having participants write an essay about how either their ideals and aspirations (promotion), or their duties and obligations (prevention) have changed from when they were a child. The synonym task and lexical decision task were identical to Study 1a.

Study 1a

Purpose and Design

Using a quasi-experimental design, this study tested the hypothesis that individuals with strong promotion ideal goals will show higher accessibility for

knowledge representations that were presented as the potential for gain/non-gain and that individuals with strong prevention ought goals will show higher accessibility for knowledge representations that were presented as the potential for non-loss/loss. Chronic regulatory focus strength was measured using the regulatory focus strength measure (Higgins et al., 1997), which measures the accessibility of participants' promotion ideal goals and prevention ought goals. Framing was manipulated on a synonym task in which some synonym items were presented as the potential to gain points for correct answers and not to gain points for incorrect answers. The other synonym items were presented as the potential not to lose points for correct answers and to lose points for incorrect answers. Therefore, the independent variables were 2 (promotion ideal goals strength, prevention ought goals strength) X 2 (gain/non-gain framing, non-loss/loss framing). The dependent measure was the response latencies on the lexical decision task.

Method

Participants

Fifty (28 female, 22 male) native English speaking Columbia University students participated and received either \$5.00, or research participation credit for their participation. Participants completed the experiment individually in sound proof rooms.

Materials and Procedure

Regulatory Focus Strength Measure

After completing the appropriate consent form, participants completed the regulatory focus strength measure. The regulatory focus strength measure is an

idiographic measure of chronic regulatory focus strength in which participants are asked to list four attributes they would “*ideally like to*” possess and four attributes they “*ought to*” possess in the seemingly random order of one ideal, two oughts, one ideal, one ought, two ideals, and one ought. After participants list each attribute, they are also asked to rate on a one-to-four scale the extent to which they would “*ideally like to*” or “*ought to*” possess, and the extent to which they actually possess, each attribute. Response latencies are collected and log transformed for each response. The log-transformed response latencies for the first-three *ideal* attributes, the first-three ratings for the extent to which they would *ideally like to* possess those attributes, and the first-three ratings for the extent to which they actually possess the attributes were summed to create the promotion-ideal-goal-strength score. The log-transformed response latencies for the first-three *ought* attributes, the first-three ratings for the extent to which they *ought to* possess the attributes, and the first-three ratings for the extent to which they actually possess those attributes were summed to create the prevention-ought-goal-strength score. Both promotion and prevention scores were then multiplied by -1 so that higher scores would indicate higher strength (Higgins et al., 1997).

The regulatory focus strength measure is widely used to assess the chronic strength of promotion ideal goals and prevention ought goals. Furthermore, the discriminant and predictive validity of the regulatory focus strength measure has been demonstrated in many studies (e.g. Förster & Higgins, 2005; Förster, et al., 1998; Freitas et al., 2002; Friedman & Förster, 2001; Higgins et al. 1997; Shah & Higgins, 1997; Shah et al., 1998). Comparable to other published studies (e.g. Freitas, Liberman, Salovey, &

Higgins, 2002; Scholer et al., 2010), Cronbach's alpha was 0.743 for promotion ideal goals strength and 0.750 for prevention ought goals strength.

Synonym Task

After participants completed the regulatory focus strength measure, they were given the following instructions:

Please identify the synonym that most closely matches the meaning of the given word. After you mark your choice, indicate how confident you are that your answer is correct. 1= not confident at all; 9= completely confident.

For each green synonym, you will gain a point for correct answers and will not gain a point for incorrect answers [gain/non-gain]. For each red synonym, you will lose a point for incorrect answers and will not lose a point for correct answers [non-loss/loss].

After you complete all of the synonyms, your total score will be compared to other Columbia participants. Successful participants are able to perform in the top 30%. When you complete all of the items, you will be told whether you scored in the top 30% or not.

Participants then completed eight synonym problems, which were selected from the list of problems included in appendix A. For example, participants were presented with the word *rest* and the choices *break*, *remains*, *relax*, *sleep*, and *predicate*. Four synonym problems were framed as the potential for gain/non-gain, and four synonym problems were framed as the potential non-loss/loss. Framing of the individual synonyms problems was counterbalanced across participants. That is, for each synonym problem, half of the participants were presented with the problem in gain/non-gain framing, and the other half were presented with the problem in non-loss/loss framing. For example, half of the

participants were presented the synonym problem for *rest* in green and, therefore, could gain points for a correct answer and not gain points for an incorrect answer. The other half of the participants were presented the synonym problem for *rest* in red and, therefore, could avoid losing points for a correct answer and lose points for an incorrect answer. The order of presentation of the synonym problems was randomized. To ensure that the participants believed they successfully completed the task, all participants were told they performed in the top 30% regardless of which synonyms they actually selected.

Lexical Decision Task

After completing the synonym task, participants were given the following instructions:

In this task, you will decide whether each of a series of stimuli is a real or nonsense word.

In each trial, you should focus on the center of the screen, and then a stimulus will be chosen randomly from a list and presented to you.

Upon seeing the stimulus, decide as quickly and as accurately as possible whether it is a real word, or a nonsense word. You should press the appropriate key as soon as you can.

Press “z” for word and press “m” for non-word.

Participants then completed four practice trials of letter strings. Following the practice trials, participants were then presented with the following letter strings: a) the 8 target synonym words (e.g. *rest*), b) 24 words (e.g. *door*) which had not been previously presented in the experiment and which had been shown to be neutral by regulatory focus

in pilot testing, and c) 32 non-words (e.g. bude). The order of presentation was randomized. The complete list of words and non-words is listed in appendix B.

Results

The dependent measure was the average response latencies on the lexical decision task. Only correct responses >250 and <1400 ms on the lexical decision task were analyzed. Ninety-eight percent of the responses met the criteria for inclusion in the analyses. Descriptive statistics for promotion ideal goals strength and prevention ought goals strength and the average response latencies for each framing are presented in table 1.

Table 1

Study 1a: Means and Standard Deviations of Regulatory Focus Strength and Response Latencies on the Lexical Decision Task

	<i>M</i>	<i>SD</i>	<i>N</i>
Unseen Words Minus Gain/Non-gain ^a in ms	56.55	54.09	50
Unseen Words Minus Non-Loss/Loss ^a in ms	52.17	83.15	50
Promotion Ideal Goals Strength ^b	-75.33	2.78	50
Prevention Ought Goals Strength ^b	-74.64	2.66	50

a. To prevent the possible confounding of increased accessibility with any overall response bias on the lexical decision task, the average response latencies of each type of word framing were subtracted from the average response latencies of the unseen words. The unseen words had been piloted to be neutral to regulatory focus. Raw response times for each word type can be found in Table 9 in Appendix C.

b. Promotion ideal goals strength and prevention ought goals strength were measured using the regulatory focus strength measure (see Higgins et al. 1997), which ask participants to list and rate attributes that they would ideally like (promotion) to possess and attributes they ought (prevention) to possess. Scores are calculated by log transforming the response latency for each response and then summing the log-transformed response latencies of the attributes and ratings for ideals (promotion ideal goals strength) and oughts (prevention ought goal strength) separately. Scores are then multiplied by -1 so that higher values will indicate greater strength.

Prior to conducting the analyses, the response latencies were log transformed because they were positively skewed. They were then averaged by framing. The average response latencies of words that had been framed as the potential for non-loss/loss were then subtracted from the average response latencies of the words that had been framed as the potential for gain/non-gain to produce the dependent measure. Positive values would indicate that words framed as the potential for non-loss/loss had faster response latencies suggesting that the non-loss/loss framing led to increased accessibility. Negative values would indicate that synonym words framed as the potential for gain/non-gain had faster response latencies suggesting that the gain/non-gain framing led to increased accessibility.

To determine whether participants' promotion ideal goals or prevention ought goals were stronger, prevention ought goals strength was subtracted from promotion ideal goals strength. This difference in regulatory focus goals strength was used as the independent variable. Higher values would indicate stronger promotion ideal goals. Lower values would indicate stronger prevention ought goals.

The data were analyzed using linear regression with the difference in regulatory focus goals strength used to predict the difference in the average response latencies between gain/non-gain synonym words and non-loss/loss synonym words. Regulatory focus goals strength was a significant predictor of the difference in response latencies between gain/non-gain and non-loss/loss framed words, $F(1,48)=4.386$, $p=.042$, $\eta^2=.084$. The results are shown in tables 2 and 3. A scatter plot showing the data is presented in figure 1.

Table 2

Study 1a: Analysis of Variance of Promotion Minus Prevention Strength Predicting the Difference in Response Latencies on the Lexical Decision Task as Calculated by Subtracting the Average of the Log-Transformed Non-loss/Loss Words from the Average of the Log-Transformed Gain/Non-gain Framed Words

Model	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2
Regression	1	.087	.087	4.386	.042	.084
Residual	48	.951	.020			
Total	49	1.038				

Table 3

Study 1a: Summary of Linear Regression of Promotion Minus Prevention Strength Predicting the Difference in Response Latencies on the Lexical Decision Task as Calculated by Subtracting the Average of the Log-Transformed Non-loss/Loss Words from the Average of the Log-Transformed Gain/Non-gain Framed Words

	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Intercept	-.019	.021		-.908	.369
Promotion Ideal Goals Strength Minus Prevention Ought Goals Strength	-.021	.010	-.289	-2.094	.042

Difference in Response Latencies Between Log Gain/Non-gain & Log Non-Loss/loss Framed Words by the Difference Between Promotion Ideal Goals and Prevention Ought Goals Strength

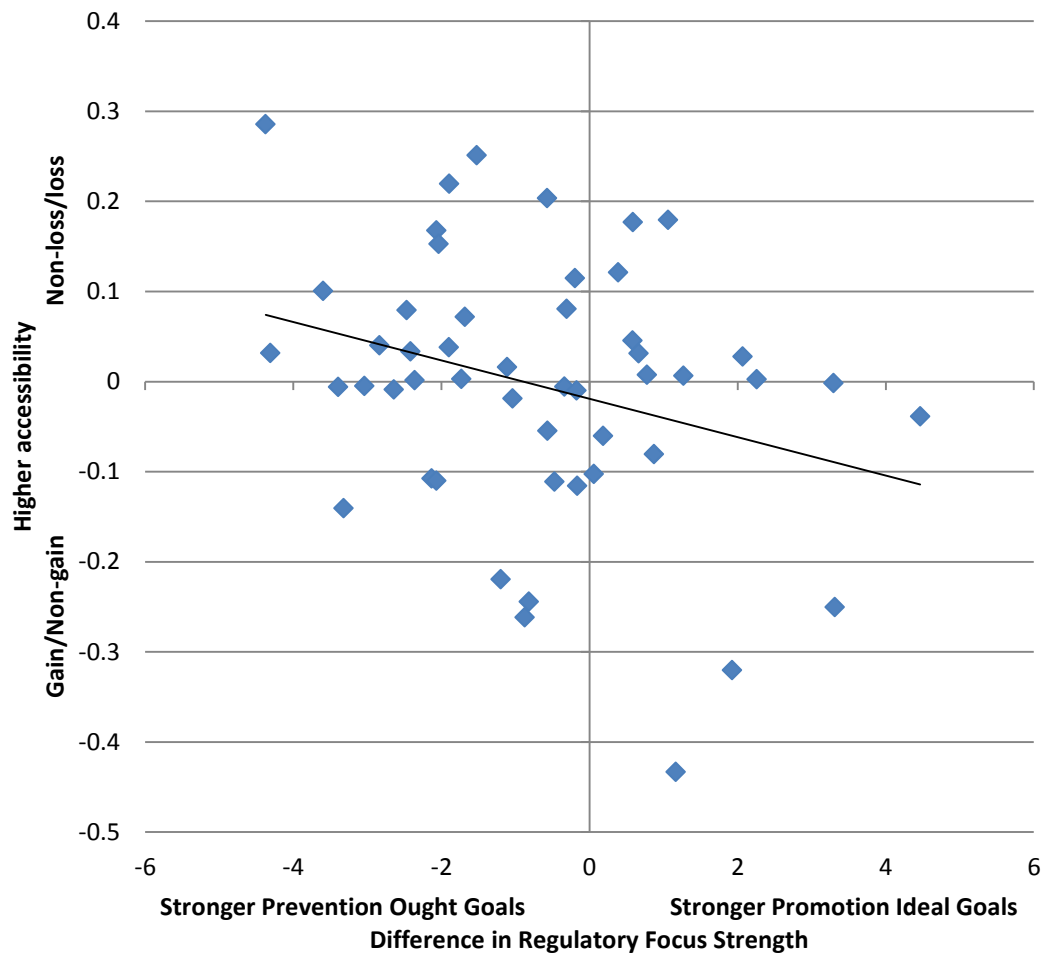


Figure 1: Values on the Y axis represent the difference in response latencies between log gain/non-gain and log non-loss/loss words. Positive values indicate higher accessibility of non-loss/loss words. Negative values indicate higher accessibility of gain/non-gain words. Values on the X axis represent the result of subtracting prevention strength from promotion strength. Negative values indicate greater predominance of prevention strength. Positive values indicate greater predominance of promotion strength.

Separate linear regression analyses did not find self-reported confidence or the amount time spent on each synonym to be significant predictors (all p values $>.15$) of response latencies on the lexical decision task. Furthermore, additional simultaneous multiple regression analyses did not find promotion ideal goals strength or prevention ought goals strength to be significant predictors (all p values $>.15$) of the difference between the amounts of time spent on gain/non-gain versus non-loss/loss synonym problems, nor did they find promotion ideal goals strength or prevention ought goals strength to be significant predictors (all p values $>.15$) of the difference between self-reported confidence on gain/non-gain versus non-loss/loss synonyms.

Discussion

Study 1a provides some initial support for the hypothesis that a promotion focus increases the accessibility of knowledge representations associated with gain/non-gain compared to representations associated with non-loss/loss and that a prevention focus increases the accessibility of knowledge representations associated with non-loss/loss compared to representations associated with gain/non-gain.

Study 1a, however, has several limitations. First, Study 1a used a quasi-experimental design. Second, though Study 1a suggests that regulatory focus influences differences between the relative accessibility of knowledge representations associated with gain/non-gain compared to non-loss/loss, Study 1a does not entirely clarify the relationship between each regulatory focus and overall accessibility. For example, it is possible that both types of knowledge representations are highly accessible. In this case, it may simply be that the framing relevant to each regulatory focus leads to higher levels of accessibility than the less relevant framing. However, it is also possible that only

knowledge representations in the framing relevant to each regulatory focus remain highly accessible. If this were the case, knowledge representations in the less relevant framing would not remain highly accessible. Study 1a does not provide a way to clearly determine which of these possibilities is correct.

Study 1b

Purpose and Design

Study 1b was designed to address some of the limitations of Study 1a. Like Study 1a, Study 1b was designed to test the hypothesis that individuals with strong promotion ideal goals will show higher accessibility for knowledge representations associated with gain/non-gain framing compared to knowledge representations associated with non-loss/loss framing. It was also designed to test the hypothesis that individuals with strong prevention ought goals will show higher accessibility for knowledge representations associated with non-loss/loss framing compared to knowledge representations associated with gain/non-gain framing. However, in Study 1b, momentary strength of participants' promotion ideal goals or prevention ought goals was experimentally manipulated by having participants either write an essay that primed either their promotion ideal goals or their prevention ought goals. Therefore, the independent variables were 2 (promotion ideal goals primed, prevention ought goals primed) X 2 (gain/non-gain framing, non-loss/loss framing). To get a better sense of whether a particular regulatory focus leads to increased accessibility or whether regulatory focus determined whether increased accessibility would continue at all, the dependent measure was the difference between the

average of the log transformed synonym words by framing and the average of the log transformed words in the lexical decision task that had not been shown in the synonym task. Sample size was also increased.

Method

Participants

One-hundred (73 female, 27 male) native English speaking Columbia University students participated and received \$5.00 for their participation. Participants completed the experiment individually in sound proof rooms.

Materials

Regulatory Focus Induction

After completing the appropriate consent forms, participants were randomly assigned to one of two regulatory focus induction conditions. Following the regulatory focus induction procedure established by Higgins, Roney, Crowe, and Hymes (1994), participants were shown either the promotion or prevention directions listed below.

Promotion:

Hopes and Aspirations

For this task, we would like you to think about how your current hopes and aspirations are different now from what they were when you were growing up. In other words, what accomplishments would you ideally like to meet at this point in your life? What accomplishments did you ideally want to meet when you were a child? In the space below, please write a brief essay describing how your hopes and aspirations have changed from when you were a child to now.

Prevention:

Duties and Obligations

For this task, we would like you to think about how your current duties and obligations are different now from what they were when you were growing up. In other words, what responsibilities do you think you ought to meet at this point in your life? What responsibilities did you think you ought to meet when you were a child? In the space below, please write a brief essay describing how your duties and obligations have changed from when you were a child to now.

Synonym Task and Lexical Decision Task

The synonym and lexical decision tasks were identical to Study 1a.

Results

The dependent measure was the response latencies on the lexical decision task. As in Study 1a, only correct responses >250 and <1400 ms on the lexical decision task were analyzed. Six participants were removed from the analysis because, out of the four responses within a particular word framing, they only had two or fewer valid responses. Furthermore, two participants were removed because they spent less than 90 seconds completing the regulatory focus induction essay. Spending less than 90 seconds may have not been sufficient for successful priming of the particular regulatory focus. For the remaining 92 participants, 98.2% of the responses met the criteria for inclusion in the analysis. Descriptive statistics are presented in table 4.

Prior to conducting any analyses and as in Study 1a, response latencies were log transformed because they were positively skewed. The response latencies were then averaged by framing. To allow for meaningful comparisons of not only the differences between gain/non-gain and non-loss/loss words within each induced regulatory focus, but

also between each regulatory focus, the averages of the log transformed words in each framing were subtracted from the average of the log transformed words that had not been shown in the synonym task. Using the difference between the framed words and the unseen words allows for a more precise measure of accessibility. It also prevents the possible confounding of any overall response bias. The unseen words had been piloted to be neutral to regulatory focus.

Table 4

Study 1b: Means and Standard Deviations of the Differences in Response Latencies on the Lexical Decision Task as Calculated by Subtracting Unseen from Framed Synonym Words for each Primed Regulatory Focus

Primed Regulatory Focus	Unseen Minus Gain/Non-Gain ^a in ms		Unseen Minus Non-loss/Loss ^a in ms		<i>N</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Promotion	63.34	49.17	31.52	68.30	46
Prevention	49.39	62.94	60.36	58.80	46

a. To prevent the possible confounding of increased accessibility with any overall response bias on the lexical decision task, the average response latencies of each type of word framing were subtracted from the average response latencies of the unseen words. Raw response times for each word type can be found in Table 10 in Appendix C.

To test the predicted two-way interaction between regulatory focus and framing, the data were analyzed using a repeated measures ANOVA with word framing (gain/non-gain, non-loss/loss) as a within-subjects factor and primed regulatory focus (primed promotion ideal goals, primed prevention ought goals) as a between-subjects factor. As predicted, the interaction of word framing and regulatory focus was significant, $F(1,90)=8.557, p=0.004, \eta^2=0.087$ (see Table 5 and Figure 2).

Table 5

Study 1b: Analysis of Variance for Regulatory Focus and Word Framing Predicting the Average Log-Transformed Response Latencies on the Lexical Decision Task

Source	<i>df</i>	SS	MS	<i>F</i>	<i>p</i>	η^2
Between Subjects						
Regulatory Focus	1	.008	.008	.732	.395	.008
Error 1	90	1.006	.011			
Within Subjects						
Word Framing	1	.006	.006	1.211	.274	.013
Regulatory Focus X Word Framing	1	.044	.044	8.557	.004	.087
Error 2	90	.468	.005			

To further investigate the relationship between words that had been framed as gain/non-gain and words that had been framed as non-loss/loss, the means of each framing were compared within each regulatory focus. A t-test for dependent groups revealed that, for participants whose promotion ideal goals were primed, response latencies for words framed as gain/non-gain were significantly faster than words framed as non-loss/loss, $t(45)=3.405$, $p=.001$, $d=.508$. However, a t-test for dependent groups did not find that there were significant differences between words framed as non-loss/loss and gain/non-gain, $t(45)=1.131$, $p=.264$, for participants whose prevention ought goals were primed.

Difference in Response Latencies Between Unseen Words and Synonym Words by Primed Regulatory Focus and Word Framing

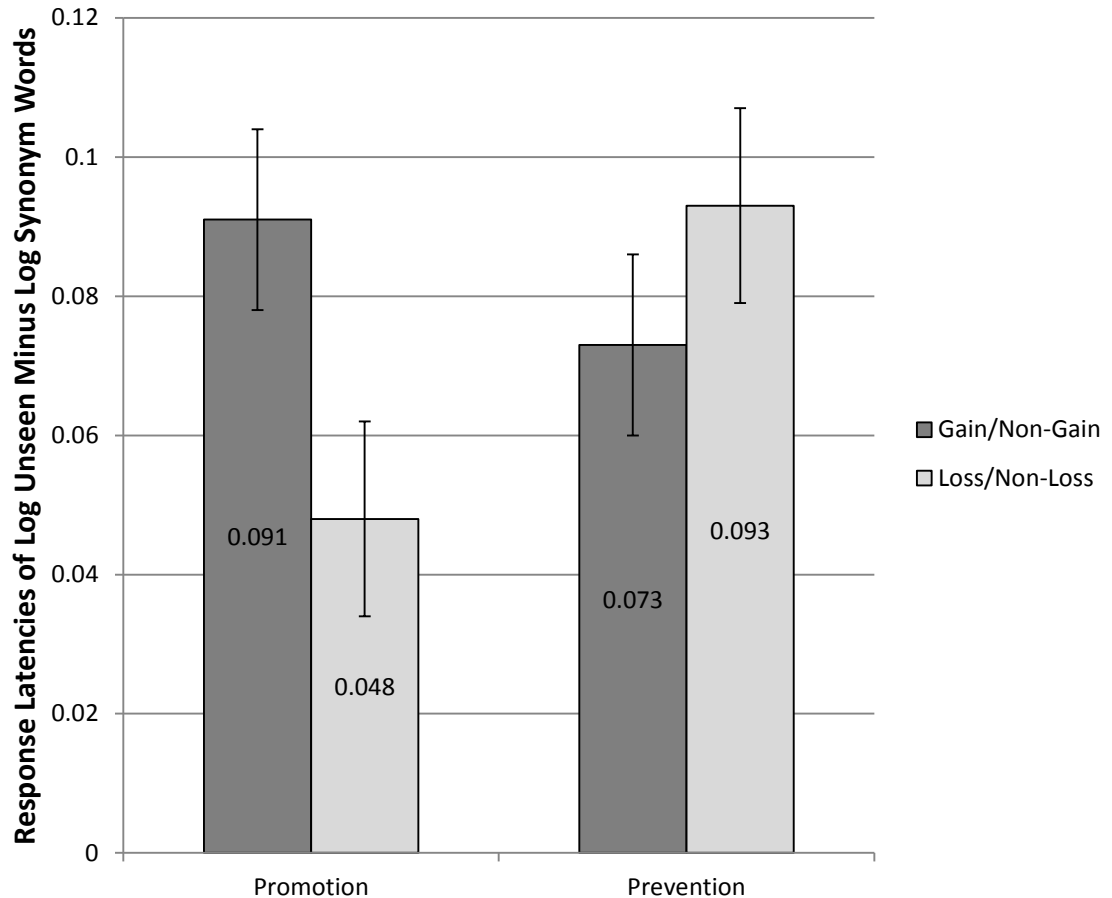


Figure 2: Values on the Y axis are calculated by subtracting the average of the log-transformed response latencies for each framing of the synonym words from the average of the log-transformed unseen words. Higher values on the Y axis suggest higher accessibility of the framed synonym words. Error bars equal one standard error of measurement.

As in Study 1a, separate linear regression analyses did not find self-reported confidence or the amount of time spent on each synonym to be significant predictors (all p values $>.15$) of response latencies on the lexical decision task. Furthermore, a repeated

measures ANOVA analysis did not find regulatory focus to be a significant predictor (all p values $>.15$) of the difference between the amounts of time spent on gain/non-gain versus non-loss/loss synonym problems nor did they find regulatory focus to be a significant predictor (all p values $>.15$) of the difference between self-reported confidence on gain/non-gain versus non-loss/loss synonyms.

Discussion

Like Study 1a, the results of Study 1b support the hypothesis that a promotion focus leads to higher accessibility of knowledge representations that were framed as the potential for gain/non-gain compared to knowledge representations that were framed as the potential for non-loss/loss. However, the results of Study 1b did not find that a prevention focus leads to the higher accessibility of knowledge representations that were framed as the potential for non-loss/loss compared to knowledge representations that were framed as the potential for gain/non-gain. In fact, the results suggest that a prevention focus may lead to higher accessibility of both knowledge representations framed as non-loss/loss and knowledge representations framed as gain/non-gain.

By using a fully experimental design, Study 1b overcame some of the limitations of Study 1a. However, Study 1b still had some limitations. In particular, Study 1b controlled for potential differences in overall response biases between a promotion and prevention focus by using the difference between the words that had been shown in the synonym task and the words that had not been shown in the synonym task. This allowed for a more precise measure of accessibility, but it does not fully clarify whether there were simply differences in the degree of accessibility between highly relevant and less

relevant words or if only highly relevant words were more accessible and less relevant word did not have any increased accessibility. This is because though the unseen words had been piloted to be regulatory focus neutral, they were not piloted to be equal in accessibility to the words that were used in the synonym task. That is, the unseen words had not been piloted to produce similar response latencies to what response latencies for the synonym words would have been if the synonym words had not been primed. Therefore, it is possible that the synonym words may be generally more accessible (even if they had not been primed) than the unseen words. If this were true, then the fact that participants took longer to respond to the unseen words may have been due to specific word characteristics and not to increased accessibility that resulted from priming the synonym target words. It is important to note, however, that this alone would not account for the interaction differences in accessibility between participants having a promotion focus versus a prevention focus and the synonym words being green, gain/non-gain words versus red, non-loss/loss words. Nevertheless, Study 2 was designed to remove this limitation.

Another limitation of both Study 1a and Study 1b is that they only used eight words in the synonym task. Though the words were counterbalanced and the results do suggest that framing influences accessibility, the fact that there were only four words within each framing may not be sufficient to suggest that the effect of framing will generalize to other words. Study 2 was also designed to reduce this limitation by using more words in the synonym task.

Chapter 4: Study 2

Purpose and Design

Study 2 examined the interaction of framing, experimentally-primed regulatory focus (like Study 1b), and experimentally manipulated perceived goal progress.

Examining perceived goal progress is important because it is possible that in studies 1a and 1b prevention focused participants adopted tactics which would increase accessibility for both non-loss/loss and gain/non-gain framed items. This could be likely to occur if prevention-focused participants believed that they may not successfully reach the goal unless they used all possible means to reach it—both non-loss means *and* gain means. It is like defensive pessimists saying to themselves that they could fail unless they were vigilant in doing everything necessary.

Therefore, in Study 2, participants were given feedback at the midpoint of the synonym task in order to experimentally manipulate perceived goal progress. Half of the participants were told they were performing in the top 28%, which is slightly above the stated goal of performing in the top 30%. In this case they could still fail, and thus they would need to use all means to succeed, including gain means. The other half of the participants were told they were performing in the top 5%, which is substantially above the stated goal. Here they can feel safe about succeeding, i.e., they have built a safe cushion, and thus can emphasize the means that fits their orientation—non-loss items rather than gain items.

Thus, the hypothesis is that prevention focused participants will show significantly higher accessibility of words framed as non-loss/loss compared to gain/non-

gain when they are told they are performing in the top 5% at midpoint, because having met the goal, it would no longer be tactically necessary to gain points. Instead, it would only be necessary to prevent loss. Evidence from Förster et al. (2001, Study 2) supports this possibility. Study 2 in the present research was designed to test this hypothesis directly. Therefore, the independent variables are 2 (promotion ideal goals primed, prevention ought goals primed) X 2 (top 28% feedback at midpoint, top 5% feedback at midpoint) X 2 (gain/non-gain framing, loss/non-framing). The dependent variable is response latencies on a lexical decision task.

Method

Participants

One-hundred eighty-six (119 female, 67 male) native English speaking Columbia University students participated and received either \$5.00, or research participation credit for their participation. Participants completed the experiment individually in sound proof rooms.

Materials and Procedure

The materials and procedure were virtually identical to Study 1b. As in Study 1b, regulatory focus was experimentally primed by randomly assigning half of the participants to write an essay about their ideals and aspirations and assigning the other half of the participants to write an essay about their duties and responsibilities.

Modified Synonym Task

After participants completed the regulatory focus priming essay, they were given a modified synonym task. The synonym task was modified in the following ways. First, instead of only eight synonyms, participants completed 16 synonym problems. A list of the synonym problems can be found in appendix A. Second, after completing the first eight synonyms, half of the participants were informed that they were performing in the top 28%. The other half of the participants were informed that they were performing in the top 5%. Consistent with Studies 1a and 1b, all participants were told, “*Success! Your performance was in the top 30% or better,*” after completing all of the synonym problems. Third, because of the increased number of synonyms, the synonyms were not only counterbalanced by framing; they were also counterbalanced by position. That is, the first eight synonyms were counterbalanced across participants with the second eight synonyms and with eight synonym problems that were not shown. The counterbalancing was done to control for any possible effects that position may have had on accessibility. Within each position (pre-feedback or post-feedback), the order of synonym problem presentation was randomized.

Modified Lexical Decision Task

For each participant, eight synonym problems were not shown in order to create a more precise control for unseen words. Counterbalancing which synonym problems were shown and not shown across participants created a more precise measure of whether the presented synonym problems had, in fact, remained highly accessible. In order to make these more precise comparisons, the words used in the lexical decision task were

modified accordingly to include the following letter strings: a) 21 of the same unseen words used in Study 1a and 1b, b) 45 non-words, and c) 24 synonym words, which were counterbalanced across participants. The 24 synonym words included the following words: a) the 8 target words that were presented as the first 8 synonym problems prior to midpoint feedback, b) the 8 target words that were presented as the second 8 synonym problems after midpoint feedback, and c) the 8 synonym target words that were not presented. As in Study 1a and 1b, order of the letter strings was randomized in the lexical decision task.

Results

The dependent measure was the response latencies on the lexical decision task. As in studies 1a and 1b, only correct responses >250 ms and <1400 ms on the lexical decision task were analyzed. Seven participants were not included in the analyses because, out of the four responses within a particular word framing, they only had two or fewer valid responses. For the remaining 179 participants, 97.4% of the responses met the criteria for inclusion in the analysis. Descriptive statistics are presented in table 6.

Prior to conducting any analyses and as in Studies 1a and 1b, response latencies were log transformed because they were positively skewed. The log-transformed response latencies were then averaged by framing. Two sets of dependent measures were then created. The first set of dependent measures subtracted the average of the log-transformed, post-feedback words by each synonym framing from the average of the log-transformed 21 words that had not been shown in the synonym task. These 21 words were the same ones that were used in Studies 1a and 1b and allow for comparisons across

the studies. The second set of dependent measures subtracted the average of the log-transformed, post-feedback words for each synonym framing from the average of the log-transformed counterbalanced unseen synonym words. This set of dependent measures was created to determine if, and to what degree, the synonym words remained highly accessible for each framing.

Table 6

Study 2: Means and Standard Deviations of the Differences in Response Latencies on the Lexical Decision Task as Calculated by Subtracting Unseen^a from Framed Synonym Words for each Primed Regulatory Focus and Midpoint Feedback Condition

Primed Regulatory Focus	Midpoint Feedback	Unseen Minus Gain/Non-Gain ^b in ms		Unseen Minus Non-loss/Loss in ^b ms		<i>N</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Promotion	Top 5%	64.39	48.11	38.09	52.25	48
	Top 28%	35.39	66.73	40.94	65.18	41
Prevention	Top 5%	36.70	58.40	66.42	49.38	48
	Top 28%	56.64	59.17	46.00	51.20	42

a. To be consistent with studies 1a and 1b, the unseen words used in this table are the same unseen words that were used in studies 1a and 1b.

b. To prevent the possible confounding of increased accessibility with any overall response bias on the lexical decision task, the average response latencies of each type of word framing were subtracted from the average response latencies of the unseen words. Raw response times for each word type can be found in Table 11 in Appendix C.

To test the predicted three-way interaction, the data were analyzed using a repeated measures ANOVA with word framing (gain/non-gain, non-loss/loss) as a within-subjects factor and primed regulatory focus (promotion ideal goals primed, prevention ought goals primed) and feedback at midpoint (top 28%, top 5%) as between-

subjects factors. The predicted three-way interaction was significant, $F(1,175)=12.516$, $p=0.001$, $\eta^2=0.067$. (see table 7)

Table 7

Study 2: Analysis of Variance for Regulatory Focus, Feedback, and Word Framing Predicting the Average of the Log-Transformed Response Latencies on the Lexical Decision Task

Source	<i>df</i>	SS	MS	F	<i>p</i>	η^2
Between Subjects						
Regulatory Focus	1	.005	.005	.607	.437	.003
Feedback	1	.002	.002	.232	.631	.001
Regulatory Focus X Feedback	1	.000	.000	.002	.960	.000
Error 1	175	1.5	.009			
Within Subjects						
Word Framing	1	.001	.001	.190	.663	.001
Word Framing X Regulatory Focus	1	.020	.020	4.288	.040	.024
Word Framing X Feedback	1	.002	.002	.326	.569	.002
Word Framing X Regulatory Focus X Feedback	1	.059	.059	12.516	.001	.067
Error 2	175	.822	.005			

Figure 3 shows, by each framing, primed regulatory focus, and feedback, the means for the difference between the post-feedback synonym words and the 21 unseen words that were used in studies 1a and 1b. Figure 3 makes it possible to compare the data from Study 2 with the data from Study 1b. Figure 4 shows, by each framing, regulatory

focus, and feedback, the means for the difference between the post-feedback synonym words and the counterbalanced control words. Figure 4 clarifies if and when activation actually occurred.

Difference in Response Latencies Between Unseen Words Used in Studies 1a and 1b and Synonym Words by Primed Regulatory Focus, Word Framing, and Midpoint Feedback

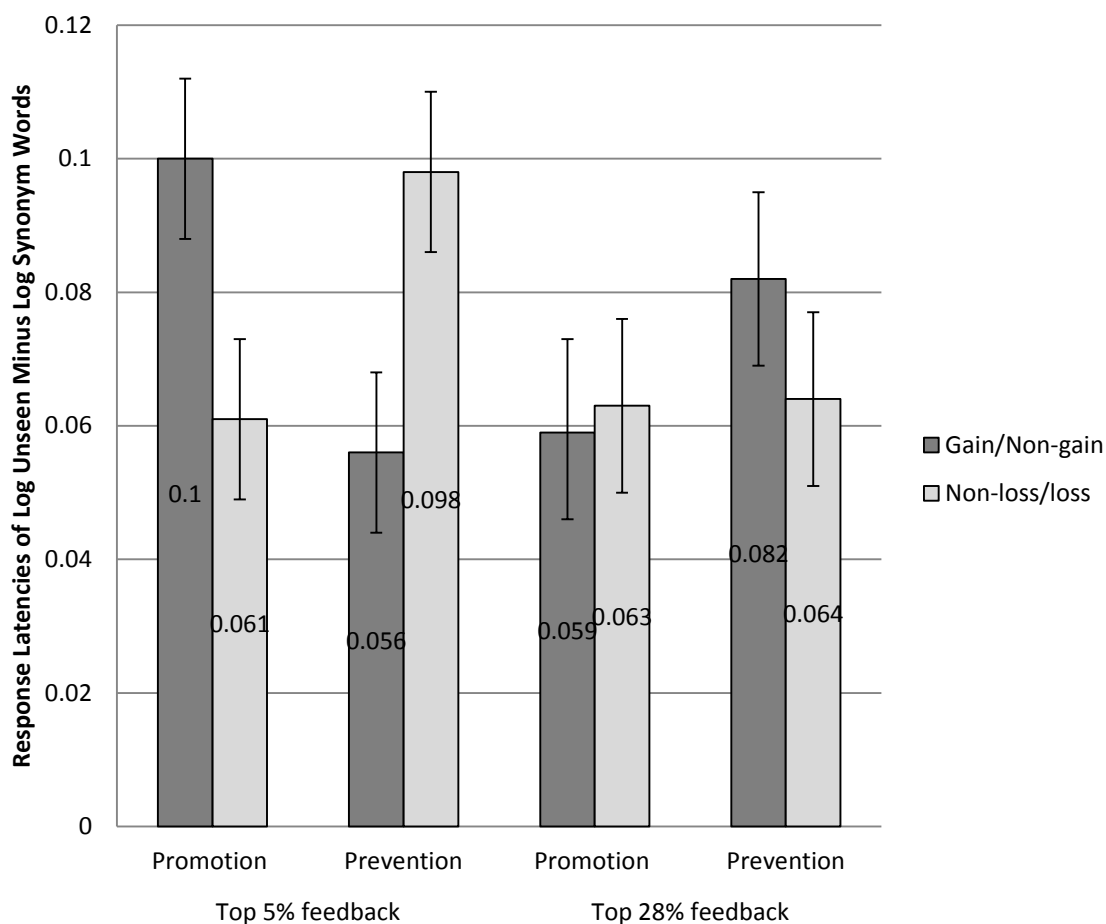


Figure 3: Values on the Y axis are calculated by subtracting the average of the log-transformed response latencies for each framing of the synonym words from the average of the log-transformed unseen words. Higher values on the Y axis suggest higher accessibility of the framed synonym words. Error bars equal one standard error of measurement

Difference in Response Latencies Between Counterbalanced Unseen Words and Synonym Words by Primed Regulatory Focus, Word Framing and Midpoint Feedback

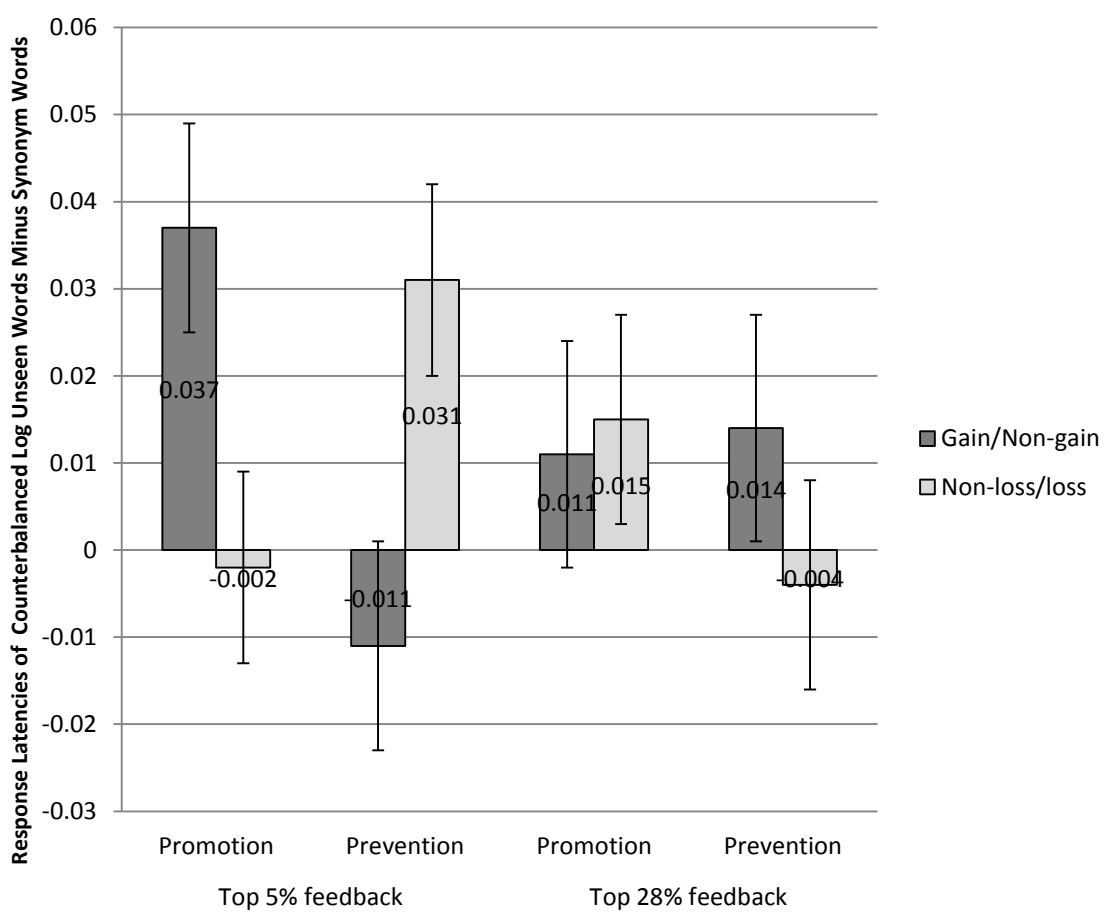


Figure 4: Values on the Y axis are calculated by subtracting the average of the log-transformed response latencies for each framing of the synonym words from the average of the log-transformed counterbalanced unseen words. Higher values on the Y axis suggest higher accessibility of the framed synonym words. Error bars equal one standard error of measurement

Since the predicted three-way interaction was significant, separate analyses were performed to examine the relationship between primed regulatory focus and word framing for each feedback condition. A repeated measures ANOVA for the top 5% midpoint feedback condition found a significant interaction between regulatory focus and word framing, $F(1,94)=22.066$, $p<.001$, $\eta^2=.190$. However, a repeated measures ANOVA for the top 28% midpoint feedback condition did not find a significant interaction between regulatory focus and word framing, $F(1,81)<1$, $p=.377$.

The data were then further analyzed for the top 5% midpoint-feedback condition to confirm the prediction that participants whose promotion ideal goals were primed would show significantly higher accessibility for words that were framed as the potential for gain/non-gain compared to words that were framed as the potential for non-loss/loss, and that participants whose prevention ought goals were primed would show significantly higher accessibility for words that were framed as the potential for non-loss/loss compared to words that were framed as the potential for gain/non-gain. For the participants whose promotion ideal goals were primed in the top 5% midpoint-feedback condition, a t-test for dependent groups revealed that words framed as gain/non-gain were significantly more accessible than words framed as non-loss/loss, $t(47)=3.335$, $p=0.002$, $d=0.481$. For the participants whose prevention ought goals were primed in the top 5% midpoint-feedback condition, a t-test for dependent groups revealed that words framed as non-loss/loss were significantly more accessible than words framed as gain/non-gain, $t(47)=3.837$, $p<0.001$, $d=0.553$.

Table 8

Study 2: Differences in Response Latencies on the Lexical Decision Task as Calculated by Subtracting the Average of the Log-Transformed Framed Synonyms from the Average of the Log-Transformed Counterbalanced Unseen Words and for Each Primed Regulatory Focus, Feedback and Word Framing Condition

Primed Regulatory Focus	Midpoint Feedback	Word Framing	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Promotion	Top 5%	Gain/Non-Gain	.0373	.0706	47	3.655	.001	.5283
		Non-loss/Loss	-.0025	.0782	47	-0.220	.826	-.0336
	Top 28%	Gain/Non-Gain	.0115	.1006	40	0.731	.469	.1143
		Non-loss/Loss	.0148	.0777	40	1.221	.229	.1905
Prevention	Top 5%	Gain/Non-Gain	-.0106	.0926	47	-0.795	.431	-.1145
		Non-loss/Loss	.0311	.0733	47	2.938	.005	.4243
	Top 28%	Gain/Non-Gain	.0140	.0743	41	1.221	.229	.1884
		Non-loss/Loss	-.0040	.0812	41	-0.316	.753	-.0493

Additional t-tests were performed to determine which conditions and framings led to increased accessibility and which did not. Results are shown in table 8. Only two combinations of framings, primed regulatory focus, and feedback, led to increased accessibility. Participants whose promotion ideal goals were primed that were informed that their performance was in the top 5% at midpoint showed significantly higher

accessibility for words that had been framed as the potential for gain/non-gain, $t(47)=3.655, p=0.001, d=0.528$. Participants whose prevention ought goals were primed that were informed that their performance was in the top 5% at midpoint showed significantly higher accessibility for words that had been framed as the potential for non-loss/loss, $t(47)=2.938, p=0.005, d=0.424$. None of the other combinations of framings, primed regulatory focus, and feedback led to response latencies that were significantly different (all p values $>.15$) from the unseen counterbalanced words.

Discussion

The results confirmed the prediction that regulatory focus would have the most influence on knowledge accessibility when participants believed they were doing well. For participants that were informed that they were performing well above the stated goal, a promotion focus led to the increased accessibility of words that were framed as the potential for gain/non-gain, and a prevention focus led to the increased accessibility of words that were framed as the potential for non-loss/loss. Therefore, Study 2 clearly demonstrates that both promotion and prevention can influence knowledge accessibility.

Surprisingly, the results did not find any increased accessibility when participants were informed that they were performing in the top 28% at midpoint. No previous study has examined the interaction regulatory focus and feedback that is this close to the goal. The present results suggest additional research which examines how feedback that is close to the goal interacts with regulatory focus may provide some additional insights into the motivational dynamics of regulatory focus.

Chapter 5: General Discussion

The purpose of the present research was to examine how strength of regulatory focus can influence knowledge accessibility. Based on regulatory focus theory (Higgins, 1997) and a new framework called ROAR (Eitam & Higgins, 2010), it was proposed that strong promotion ideal goals will lead to the increased accessibility of knowledge representations that were presented as the potential for gain/non-gain, whereas strong prevention ought goals will lead to the increased accessibility of knowledge representations that were presented as the potential for non-loss/loss.

Three studies which examined these proposals were reported. Study 1a examined influence of the chronic strength of participants' regulatory focus by measuring the accessibility of participants' promotion ideal goals and prevention ought goals. Results indicated that stronger promotion ideal goals were associated with increased accessibility of words that had been presented as the potential for gain/non-gain. In contrast, stronger prevention ought goals were associated with increased accessibility of words that had been presented as the potential for non-loss/loss.

Study 1b experimentally manipulated the strength of participants' promotion ideal goals or prevention ought goals by having participants either write an essay about how their ideals had changed from when they were a child (promotion), or write an essay about how their oughts had changed from when they were a child (prevention). Results indicated that priming promotion ideal goals by having participants write an essay about their ideals led to significantly greater accessibility of words that were presented as the potential for gain/non-gain compared to words that had been presented as the potential

for non-loss/loss. In contrast, priming prevention ought goals by having participants write an essay about their oughts led to greater accessibility of both, words that were presented as the potential for gain/non-gain, and words that had been presented as the potential for non-loss/loss.

Study 2 extended Study 1b by examining how feedback interacts with regulatory focus to influence the accessibility of words presented as the potential for gain/non-gain versus words presented as the potential for non-loss/loss. Regulatory focus was experimentally manipulated using the same procedure used in Study 1b. Unlike Study 1b, participants were given randomly assigned (false) feedback after completing half of the priming (i.e. the synonym) task. Half the participants were told they were performing slightly above the stated goal; the other half were told they were performing substantially above the stated goal. Results indicated that informing participants whose promotion ideal goals were primed that they were substantially above the stated goal led to increased accessibility of gain/non-gain words. However, participants whose promotion ideal goals were primed did not show increased accessibility of non-loss/loss words. In contrast, informing participants whose prevention ought goals were primed that they were substantially above the stated goal led to increased accessibility of non-loss/loss words. However, participants whose prevention ought goals were primed did not show increased accessibility of gain/non-gain words. No changes in accessibility were found for participants that were informed at midpoint that they were only performing slightly above the stated goal.

Taken together, the data from the three studies strongly support the hypothesis that a stronger promotion focus will increase the accessibility of task-related items

associated with the potential for gain/non-gain. These data also support the hypothesis that a stronger prevention focus will increase the accessibility of task-related items associated with the potential for non-loss/loss, but the data from Study 1b also suggest that there may be instances when a stronger prevention focus can also increase the accessibility of task-related items associated with the potential for gain/non-gain. Furthermore, the data from Study 2 indicate that perceived progress can interact with regulatory focus to influence the accessibility of task-related items.

The present research has significant theoretical implications. First, the experimental paradigm developed and used in the present research demonstrated that regulatory focus can influence implicit and fundamental cognitive processes. Second, this demonstration that regulatory focus can influence implicit and fundamental cognitive processes further supports regulatory fit theory (Higgins, 2000, 2005).

Third, Study 2 strongly suggests that tasks or task items which do not fit participants' regulatory orientation are essentially motivationally irrelevant when participants believe they are performing well above the goal. This demonstration was possible because Study 2 counterbalanced unseen words with the primed, synonym words. By counterbalancing the unseen words with the primed words, it was possible to get a baseline for the response latencies of each participant that was regulatory-focus neutral and that controlled for any possible overall response biases that were not explained by differences in accessibility. It was not really possible to have this level of control in the previous studies which examined the influence of regulatory focus on motivation to solve anagrams (e.g. Shah et al. 1998, Forster et al. 1998, 2001) because it is not clear how one would create a neutral measure of persistence for anagrams. Even if

some anagrams were presented without gain/non-gain or non-loss/loss framing, that does not mean that participants would not perceive them as the potential for gain/non-gain or non-loss/loss. Without framing that is manipulated by the experimenter, it is possible and perhaps even likely that participants will perceive the anagram in a way that fits with their regulatory focus.

The present research may also have significant practical applications. Unlike other research which has demonstrated that regulatory focus can influence knowledge accessibility for *different* stimuli (e.g. Cunningham, Raye & Johnson, 2005; Higgins et al., 1994; Touryan et al. 2007) the present research demonstrated that the interaction of framing and regulatory focus could influence knowledge accessibility of the *same* stimuli. Therefore, the present research may be useful in fields, such as education, software design, marketing, etc. For example, the present research suggests that educational software which applies the principles of regulatory fit could potentially improve student learning. Increased knowledge accessibility could be achieved by having the software match the *framing* of task-related items to the chronic regulatory focus of the student using the software.

Though the present research provides some answers on how regulatory focus can influence knowledge accessibility, it also opens many questions. For example, the present research found that regulatory focus can influence whether knowledge is highly accessible, but it did not really examine how that knowledge actively influences thought and action. It is possible that there will be differences in the flexibility of the accessible representations depending on regulatory focus. For example, it is possible that promotion focused individuals may be more able to flexibly adapt the accessible knowledge to

alternative applications. This possibility is suggested by work which has examined how regulatory focus can influence creativity (e.g. Baas, Dreu, & Nijstad, 2008; Friedman & Förster, 2001). Further examining this possibility would have important implications for determining possible practical implications of this research. This is because while it is obvious that there are times when increasing knowledge accessibility could be useful, there can also times when increased knowledge accessibility may lead to problems such as fixation in problem solving (cf. Smith & Blankenship, 1991).

Another reason for examining how increased knowledge accessibility will influence the thoughts and actions of individuals is that regulatory focus may also influence *how* accessible knowledge is applied. For example, out of a concern to be accurate, prevention-focused individuals may not necessarily be as willing to use highly accessible knowledge without checking other alternatives first. Therefore, while the present research used an implicit measure of accessibility and has the advantage of demonstrating that regulatory focus can influence *whether* activated knowledge remains highly accessible, an explicit measure may be useful for further understanding *how* increased knowledge accessibility influences participants.

The present research also opens many questions pertaining to how perceived progress interacts with regulatory focus. Study 2 was the first reported study to examine how regulatory focus interacts with midpoint feedback that informs participants that they are only slightly above the goal or that they are significantly exceeding the goal. Examination of both Study 1b and Study 2 suggests that perceived progress may play a particularly important role in the motivational dynamics of a prevention focus. Study 1b found that strong prevention ought goals led to increased accessibility of both

non-loss/loss and gain/non-gain framed words, whereas Study 2 found that, when participants think they are performing significantly above the goal, only non-loss/loss framed words were more accessible. This level of precision in examining the relation between perceived progress and a prevention focus has not previously been reported. Therefore, research which further explores how perceived progress interacts with a prevention focus should provide new insights on how a prevention focus can influence fundamental cognitive and motivational processes.

Though Study 2 did not find any significant differences when participants were informed that they were only slightly above the goal at midpoint, further examining the influence of close feedback may prove to be highly informative about the motivational dynamics of regulatory focus. For example, it is possible that midpoint feedback which was only slightly above the stated goal may have been insufficient to sustain the primed regulatory focus. If this occurred then participants may have returned to their chronic orientation rather than continuing in the primed regulatory focus. Since Study 2 did not measure chronic regulatory focus, it was not possible to determine if this occurred. Therefore, it may be useful to examine the interaction of feedback that is only slightly above that stated goal with a measure of chronic regulatory focus since chronic regulatory focus should be more stable.

Conclusion

The present research explored how regulatory focus can determine when knowledge representations associated with gain/non-gain versus non-loss/loss will be more accessible. The results support regulatory focus theory (Higgins, 1997) and the

ROAR framework (Eitam & Higgins, 2010). All three studies found that strong promotion ideal goals were associated with faster access to gain/non-gain items. The relation between strong prevention ought goals and knowledge accessibility was more complex. Study 1b found that strong prevention ought goals were associated with faster access to both gain/non-gain and non-loss/loss framed synonyms. Study 2 found that, when participants were given feedback indicating that they were significantly exceeding the goal, strong prevention ought goals was associated with faster access to only non-loss/loss framed synonyms. These results highlight that, in addition to considering *how* priming can influence the thoughts and actions of individuals, it is also important to consider factors that will influence *when* priming will have influence. Furthermore, beyond considering *whether* individuals are motivated or *what* they are motivated to accomplish, the present research also highlights that it is important to consider *how* the individuals are motivated.

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Appendix A

1. pack

_____ bundle
 _____ group
 _____ compress
 _____ store
 _____ kit

3. rest

_____ break
 _____ remains
 _____ relax
 _____ sleep
 _____ predicate

5. post

_____ pillar
 _____ assignment
 _____ place
 _____ report
 _____ station

7. suit

_____ accommodate
 _____ ensemble
 _____ case
 _____ tailor
 _____ satisfy

9. play

_____ perform
 _____ leeway
 _____ teasing
 _____ participate
 _____ recreation

11. base

_____ bed
 _____ garrison
 _____ source
 _____ headquarters
 _____ foundation

2. call

_____ appeal
 _____ summon
 _____ guess
 _____ declare
 _____ phone

4. fair

_____ light
 _____ ordinary
 _____ festival
 _____ decent
 _____ just

6. mark

_____ record
 _____ stamp
 _____ target
 _____ blemish
 _____ score

8. ring

_____ band
 _____ buzz
 _____ encompass
 _____ resound
 _____ circle

10. head

_____ run
 _____ start
 _____ director
 _____ champion
 _____ lead

12. short

_____ petite
 _____ deficient
 _____ snippy
 _____ abridged
 _____ brusque

13. pitch

_____spiel
 _____note
 _____raise
 _____toss
 _____tilt

15. power

_____capacity
 _____force
 _____authority
 _____influence
 _____strength

17. table

_____spread
 _____postpone
 _____chart
 _____diagram
 _____buffet

19. sweet

_____kind
 _____sugary
 _____harmonious
 _____candy
 _____perfumed

21. bill

_____brim
 _____check
 _____placard
 _____statute
 _____tab

23. club

_____bat
 _____lodge
 _____league
 _____bar
 _____bash

14. broad

_____nonspecific
 _____general
 _____expansive
 _____comprehensive
 _____open

16. sore

_____irate
 _____aching
 _____ulcer
 _____resentful
 _____severely

18. stock

_____banal
 _____inventory
 _____descent
 _____assessment
 _____store

20. care

_____meticulousness
 _____consideration
 _____custodianship
 _____mind
 _____favor

22. match

_____bout
 _____equivalent
 _____counterpart
 _____parallel
 _____duplicate

24. turn

_____cogitate
 _____redirect
 _____curve
 _____rotate
 _____divert

25. field

_____plot

_____zone

_____addres

_____take

_____discipline

26. full

_____especially

_____aggregate

_____stuffed

_____replete

_____total

Appendix B

Letter strings used in the lexical decision task

CALL	REST	FAIR	RING	PLAY	BASE	POWER	LINEN
SWEET	WERE	CREW	CAFE	DOOR	GAVE	SOAR	JUICE
WIPE	TREE	SOUP	POND	MALL	LAMP	AWAY	KNIFE
CHIP	EDIT	PAGE	CART	ADULT	SHRUB	MONTH	HABIT
SORE	MATCH	BILL	CARE	FULL	PACK	MARK	STOCK
FIELD	POST	SUIT	TABLE	TURN	HEAD	SHORT	CLUB
PITCH							

AWER	BUDE	CISE	DRET	EPTY	FEDL	GIFL	HISE
IFET	JINL	KOPR	LUTW	MAMD	NAXT	OPTE	PRUJ
QURE	RESM	SHEJ	TRIW	USTE	VADT	WHIK	YOLB
WHESM	STREM	DAGES	FRAMT	BROSK	CHITE	HUSTI	JOPRT
MILP	FORW	CTER	ZADW	KONP	NOMTS	LINF	QUED
RENX	DONJM	SMNTZ	FIRX	JMOLW	WRYGX	PRAKL	BLIX

Appendix C

Table 9

Study 1a: Means and Standard Deviations of Each Word Type and Each Type of Response on the Regulatory Focus Strength Measure

	<i>M</i>	<i>SD</i>	<i>N</i>
Gain/Non-gain Words in ms	584.26	79.83	50
Non-Loss/Loss Words in ms	589.61	94.60	50
Unseen Words	640.81	70.76	50
Sum of First-Three Log-Transformed Ideal Attributes	28.02	1.48	50
Sum of First-Three Log-Transformed Ratings of How Much Participants Would "Ideally Like to" Possess Ideal Attributes	24.31	1.03	50
Sum of First-Three Log-Transformed Ratings of Actual Extent Participants Posses Ideal Attributes	23.00	1.02	50
Sum of First-Three Log-Transformed Ought Attributes	27.95	1.22	50
Sum of First Three Log-Transformed Ratings of How Much Participants "Ought to" Posses Ought Attributes	24.17	1.06	50
Sum of First-Three Log-Transformed Ratings of How Much Participants Actually Possess Ought Attributes	22.52	1.38	50

Table 10

Study 1b: Means and Standard Deviations of Each Word Type by Primed Regulatory Focus

Primed Regulatory Focus	Gain/Non-Gain Words in ms		Non-loss/Loss Words in ms		Unseen Words in ms		<i>N</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Promotion Ideal Goals	597.17	98.34	628.98	112.24	660.50	91.84	46
Prevention Ideal Goals	592.01	80.58	581.88	80.10	642.25	66.28	46

Table 11

Study 2: Means and Standard Deviations of Each Word Type by Primed Regulatory Focus and Feedback

Primed Regulatory Focus	Feedback	Gain/Non-Gain Words in ms		Non-loss/Loss Words in ms		Unseen Words ^a in ms		N
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Promotion Ideal Goals	Top 5%	541.72	67.88	568.02	86.64	606.11	79.37	48
	Top 28%	573.13	77.23	567.58	64.73	608.11	68.23	41
Prevention Ideal Goals	Top 5%	591.36	92.98	561.64	72.24	628.07	77.66	48
	Top 28%	571.50	78.32	582.15	80.09	628.10	73.33	42

a. To be consistent with Studies 1a and 1b, the unseen words used here are the same unseen words that were used in Studies 1a and 1b.