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Approach and Avoidance Strength During Goal Attainment: Regulatory Focus and the "Goal Looms Larger" Effect

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Three studies tested the hypothesis that regulatory focus, both as a chronic person variable and as a manipulated situational variable, differentially affects the strength of participants' approach and avoidance strategic motivations as they get closer to the goal. In 2 studies, flexion and extension arm pressure were used as on-line measures of approach and avoidance intensity, respectively. As predicted, the approach gradient was steeper for participants with a promotion focus on aspirations and gains than for participants with a prevention focus on responsibilities and nonlosses, whereas the reverse was true for the avoidance gradient. In a third study, the same pattern of results was found on a persistence measure of motivational strength. Participants with a promotion focus worked longer on anagrams closer to the goal when they were approach means for goal attainment than when they were avoidance means, whereas the reverse was true for participants with a prevention focus.

People are motivated to approach pleasure and avoid pain. Historically, this hedonic principle has dominated the research on motivation and is a basic assumption underlying classic theories in many areas of psychology, including theories of emotion in psychobiology (e.g., Gray, 1982), conditioning in animal learning (e.g., Mowrer, 1960; Thorndike, 1935), decision making in cognitive psychology (e.g., Edwards, 1955; Kahneman & Tversky, 1979), consistency in social psychology (e.g., Festinger, 1957; Heider, 1958), and achievement motivation in personality (e.g., Atkinson, 1964). The basic assertion that people approach pleasure and avoid pain does not explain, however, *how* people approach pleasure and avoid pain in substantially different strategic ways (see Higgins, 1997). To understand such differences, it is necessary to examine other self-regulatory principles that underlie how the hedonic principle operates. One such principle is regulatory focus (see Higgins, 1997, 1998). Does regulatory focus have implications for approach and avoidance motivations beyond the hedonic principle? In our research we addressed this question by considering how regulatory focus influences approach–avoidance strength during goal attainment.

We begin by describing the approach–avoidance principle of regulatory focus and reviewing studies showing that people's approach and avoidance strategies vary as a function of their regulatory focus. We then argue that these strategic differences should influence the strength of people's approach and avoidance motivations as they work to attain a desired goal, as reflected in different approach and avoidance gradients. Finally, we report three studies testing our hypotheses in which regulatory focus was both a chronic person variable and a manipulated situational variable and motivational strength was measured by both intensity and persistence.

Regulatory Focus and Distinct Strategies of Goal Attainment

According to the hedonic principle, people approach desired end states (pleasure) and avoid undesired end states (pain). These two motivations have been distinguished in animal learning models (e.g., Gray, 1982; Hull, 1952; Konorski, 1967; Lang, 1995; Miller, 1944; Mowrer, 1960), cybernetic-control models (e.g., Carver & Scheier, 1990; Powers, 1973), and dynamic models (e.g., Atkinson, 1964; Lewin, 1935; McClelland, Atkinson, Clark, & Lowell, 1953). These models, however, do not distinguish between different strategies of approaching desired end states or goal attainment. Regulatory focus theory, however, proposes that there are different strategies for goal attainment, varying by regulatory focus, that have motivational significance in their own right.

Regulatory focus theory assumes that the hedonic principle operates differently when serving goals with a different regulatory focus. These distinct goals can be emphasized either chronically or momentarily. Caretaker–child interactions, for example, can chronically emphasize goals with either a promotion focus or a prevention focus. We briefly consider different forms of

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caretaker–child interactions to illustrate the difference between a promotion focus and a prevention focus (see also Higgins, 1989, 1998).

Children in caretaker–child interactions that involve a *promotion focus* experience pleasure when caretakers, for example, reward a child's behavior by hugging and kissing the child or by encouraging the child to seek opportunities to engage in rewarding activities. The child experiences pain, when caretakers, for example, stop a story when a child is not paying attention. The pleasure or pain from these interactions is experienced as the presence or absence of positive outcomes, respectively. The caretakers' messages are communicated in reference to a state of the child that does or does not attain some promotion goal, either "This is what I ideally like you to do" or "This is not what I ideally like you to do," respectively. The regulatory focus is one of promotion, a concern with advancement and accomplishment, hopes, and aspirations (ideals).

Children in caretaker–child interactions that involve a *prevention focus* experience pleasure when caretakers, for example, train the child to be alert to potential dangers or teach the child to "mind your manners." The children experience pain when caretakers, for example, yell at or punish the child for being irresponsible. Here, the pleasure and pain are experienced as the absence or presence of negative outcomes. The caretakers' messages are communicated in reference to a state of the child that does or does not attain some prevention goal, either "This is what I believe you ought to do" or "This is not what I believe you ought to do," respectively. The regulatory focus is one of prevention, a concern with protection and safety, duties, and responsibilities (oughts).

Regulatory focus theory, then, distinguishes between two kinds of goal attainment that vary in chronic focus: attainment of aspirations and accomplishments (promotion focus) and attainment of responsibilities and safety (prevention focus). According to the theory, momentary situations can also temporarily induce either a promotion focus or a prevention focus on goal attainment. For example, feedback messages or task instructions can communicate gain–nongain information (promotion focus) or nonloss–loss information (prevention focus).

What consequences does regulatory focus have on people's strategic inclinations to approach versus to avoid? In answering this question, we consider strategies for attaining goals or desired end states because this is the kind of self-regulation that has been emphasized in the literature (see, e.g., Carver & Scheier, 1981, 1990; Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Gollwitzer & Bargh, 1996; Miller, Galanter, & Pribram, 1960; Pervin, 1989; von Bertalanffy, 1968). It is also the kind of self-regulation examined in our studies. The goals people are motivated to attain can be either promotion focus aspirations and accomplishments or prevention focus responsibilities and safety.

Higgins, Roney, Crowe, and Hymes (1994) tested whether participants' strategic inclinations for approach versus avoidance were influenced by their regulatory focus. They used a priming technique to activate either promotion focus ideals or prevention focus oughts by asking participants to report either on how their hopes and aspirations have changed over time or on how their sense of duty and obligation has changed over time, respectively. Afterward, participants read about several episodes that occurred over a few days in the life of another student. The episodes involved the target person using either the strategy of approaching a match to a goal (e.g., "Because I wanted to be at school for the beginning of my 8:30 psychology class, which is usually excellent, I woke up early in the morning") or the strategy of avoiding a mismatch to a goal (e.g., "I wanted to take a class in photography at the community center, so I didn't register for a class in Spanish that was scheduled at the same time"). The participants were then asked to recall the episodes. As predicted, the participants primed with promotion focus ideals recalled better the episodes exemplifying approaching a match to a goal than those exemplifying avoiding a mismatch, whereas the reverse was true for participants primed with prevention focus oughts. In another study, Higgins et al. (1994) also found that participants with a chronic ideal promotion focus were more likely to select friendship tactics that involved approaching matches to this goal (e.g., "Be supportive to your friends") than tactics that involved avoiding mismatches (e.g., "Stay in touch. Don't lose contact with friends"), whereas the reverse was true for participants with a chronic ought prevention focus.

If individuals in a chronic promotion focus are more strategically inclined to approach matches for goal attainment than to avoid mismatches, they should perform better when an incentive is framed as approaching a match to a goal than as avoiding a mismatch. The reverse should be true for individuals in a chronic prevention focus. Shah, Higgins, and Friedman (1998) tested this prediction by asking participants to perform an anagram task, in which the goal was to identify 90% of the possible words. To select participants with either a chronic promotion focus or a chronic prevention focus, Shah et al. (1998) measured the accessibility of their ideals and oughts, in which high ideal accessibility reflected a chronic promotion focus and high ought accessibility reflected a chronic prevention focus. Consistent with previous research on attitude accessibility (see Bassili, 1995, 1996; Fazio, 1986, 1995), the accessibility of ideals and oughts was measured by participants' reaction times (RTs) when answering questions on a computer about their ideals and oughts.

To manipulate the regulatory focus of the incentives, we used a promotion framed condition that emphasized the strategy of approaching a match to the goal by telling participants that they would earn an extra dollar by finding 90% or more of the words, whereas a prevention framed condition emphasized the strategy of avoiding a mismatch to the goal by telling participants that they would avoid losing a dollar by not missing more than 10% of the words. Shah et al. (1998) found that for the chronic promotion focus, participants' performance was better with the "approaching a match" incentive than the "avoiding a mismatch" incentive, whereas the reverse was true for chronic prevention focus participants.

The results of these studies support the proposal that there are regulatory focus differences in strategic inclinations for goal attainment. Specifically, a promotion focus involves a strategic inclination to approach matches to goals, whereas a prevention focus involves a strategic inclination to avoid mismatches. It is noteworthy that people in a prevention focus have a strategic

avoidance inclination even though they are motivated to attain (approach) a goal. This suggests that the strength of approach versus avoidance strategic motivations as individuals work to attain a goal could vary as a function of regulatory focus. We now turn to this issue.

Approach and Avoidance Strength During Goal Attainment as a Function of Regulatory Focus

A classic proposal concerning goal attainment is that motivational strength increases as distance from the goal decreases; that is, the motivational properties of the goal "loom larger" as one is closer to it (Lewin, 1935; Miller, 1944, 1959). In a classic study testing this proposal, Brown (1948) trained one group of rats to run down a short alley to attain food when hungry. Each rat wore a little harness connected to a recording device such that the strength of its pull when stopped at a specific point in the alley could be measured in grams. Brown (1948) found that the animals stopped nearer to the food pulled harder than those who were stopped farther away. This stronger motivation closer to the goal has been observed in several subsequent studies (e.g., Gjesme, 1974; Hearst, 1960, 1962; Losco & Epstein, 1977; Miller & Kraeling, 1952; Miller & Murray, 1952; Murray & Berkun, 1955; Rigby, 1954; Smith, 1965, 1969). How might this stronger motivation vary by regulatory focus?

As reviewed earlier, there is evidence that both approach and avoidance strategic motivations can be involved when participants work to attain goals. Thus, both approach and avoidance strategic motivations could increase as a goal looms larger. When people are motivated to attain a goal, such as attaining an *A* on a quiz, they can either study hard the night before the quiz (approaching a match), or they can turn down an invitation to go out to a party before the quiz (avoiding a mismatch). The research by Higgins et al. (1994) and Shah et al. (1998) indicates that strategic approach is more likely for individuals in a promotion focus, whereas strategic avoidance is more likely for individuals in a prevention focus. This suggests that as goal attainment is closer, strategic approach motivation should increase for individuals in a promotion focus and strategic avoidance should increase for individuals in a prevention focus. To understand this prediction better, it is important to consider briefly why the goal looms larger to begin with.

While working toward a goal, each step that makes goal attainment more likely is a success. The value of a success increases as its contribution to goal attainment increases (for a review, see Brendl & Higgins, 1995). The contribution of a success to goal attainment depends on the magnitude of the remaining discrepancy to the goal that it reduces. If there are equal steps taken while working toward the goal, each step reduces a higher proportion of the remaining discrepancy. If the goal is to solve each of 10 anagrams, for example, solving the first reduces 10% of the remaining discrepancy, whereas solving the last reduces 100% of the remaining discrepancy. Thus, the value of a success increases as one is closer to the goal. The greater the value of succeeding, the stronger the motivation to succeed, and the stronger the motivation to succeed, the stronger the strategic motivations that yield success. These strategic motivations, however, are different for goal attainment with a promotion focus versus a prevention focus. Individuals in a promotion focus strategically approach to ensure success, whereas individuals in a prevention focus strategically avoid to ensure success. Thus, as the goal looms larger, an increase in strategic approach motivation should be more evident for people in a promotion focus than for people in a prevention focus, whereas an increase in strategic avoidance motivation should be more evident for people in a prevention focus than for people in a promotion focus. To test these predictions, we thought it necessary to measure strength of approach motivation and strength of avoidance motivation independently and on-line while individuals worked to attain the goal. In the first two studies, we used a new measure of motivational intensity that we developed to accomplish this.

This measure was based on earlier research that showed that inducing motivational orientations through motor movements or positions unobtrusively influences people's feelings and information processing (for a review, see Adelman & Zajonc, 1989). In one study, for example, arm positions that were specific for feelings of approach versus avoidance were used to test their regulative influence on attitudes (Cacioppo, Priester, & Berntson, 1993). Arm flexion (in which the direction of force is toward the self) is more associated with the consumption or acquisition of a desired stimulus (i.e., approach), whereas arm extension (in which the direction of force is away from the self) is more associated with rejection (i.e., avoidance). Consistent with their predictions, Cacioppo et al. (1993) found that neutral objects (Chinese ideographs) that were evaluated during arm flexion were subsequently preferred to objects evaluated during arm extension. There is increasing evidence demonstrating the influence of these arm positions in the predicted direction for judgments of neutral objects (Cacioppo et al., 1993; Priester, Cacioppo, & Petty, 1996), interpersonal judgments (Förster, in press), and retrieval of valenced information (Förster & Strack, 1997, 1998). It has also been demonstrated that it is easier for participants to pull positive items toward them (activating arm flexion) than negative items, whereas it is easier to push away negative items (activating arm extension) than positive items (Chen & Bargh, in press; Solarz, 1960). In all of these studies, participants were not aware of the influence of their arm position (see Förster, in press, Study 2), and, when measured, no mediation by either mood, pleasantness, or effort was found. Taken together, these studies demonstrate that arm flexion is generally associated with approach, whereas arm extension is generally associated with avoidance.

In the first two studies, we used arm flexion and arm extension as on-line dependent variables to measure the intensity strength of approach and avoidance strategic motivations, respectively. We predicted that as participants moved closer to goal attainment, those with a promotion focus would press harder than those with a prevention focus when they had to flex their arm (approach), whereas those with a prevention focus would press harder than those with a promotion focus when they had to extend their arm (avoidance). We tested this hypothesis in Study 1 for chronic individual differences in regulatory focus and in Study 2 by situationally manipulating regulatory focus. In Study 3 we investigated the effects of both chronic and situationally induced regulatory focus on a different persistence measure of motivational strength.

Study 1

Method

Overview

Four months before the actual study started, participants filled out a computerized questionnaire used to measure individual differences in chronic regulatory focus operationalized in terms of the strength of different self-regulatory guides. They were then called back for a supposedly unrelated physiological study on "new measures of emotions and motivation."

Each of the participants received two sets of seven solvable anagrams on a computer and had to find as many solutions as possible to each anagram. While solving one set of anagrams, they had to press upward on a skin conductance machine attached to the bottom of a table. While solving the other set of anagrams, they had to press downward on the machine attached to the top of the table. Before working on each anagram in each set, the participants were reminded which of the anagrams was next (e.g., Anagram 2). At this point, the experimenter recorded the arm pressure from a display on the skin conductance machine. The correct solutions of the anagrams were also recorded by the experimenter.

Participants

Thirty-two Columbia University undergraduates (22 women and 10 men) participated in the study for $8 each. They were selected from a larger sample of participants who had completed a computerized measure of self-guide strength as part of a battery of measures 4 months earlier. One additional student who participated in the study was excluded for failing to fill out two of the mood questionnaires. Including this participant in the analyses did not change the significance of any of the results reported. Participants were tested individually. Gender did not moderate any of the significant effects reported.

Materials

Strength of regulatory focus. The computer questionnaire is an idiographic measure that asks participants to list attributes describing different self-representations from their own standpoint (see Higgins, Shah, & Friedman, 1997; Shah & Higgins, 1997). The questionnaire first defines ideal self-guides and ought self-guides. The ideal self-guide is defined as the type of person participants would ideally like to be, the type of person they hope or aspire to be, whereas the ought self-guide is defined as the type of person participants believe they ought to be, the type of person they believe it is their duty or responsibility to be. The participants are then asked to provide attributes describing their ideal and ought selves as quickly and accurately as possible. They are also told that the ideal and ought attributes should be different from one another.

Participants provided three ideal self-attributes and three ought self-attributes in a seemingly random order. After each ideal attribute, they had to rate the extent to which they ideally would like to possess it as well as the extent to which they actually possessed it. After each ought attribute, they had to rate the extent to which they believed they ought to possess it as well as the extent to which they believed they actually possessed it. All rating scales ranged from 1 (*slightly*) to 4 (*extremely*).

Thus, six measures were obtained for each participant: (a) the RT to produce an ideal self-guide attribute, (b) the RT to make an ideal self-guide extent rating, (c) the RT for an actual self extent rating in relation to an ideal self-guide, (d) the RT to produce an ought self-guide attribute, (e) the RT to make an ought self-guide extent rating, and (f) the RT to make an actual self extent rating relative to an ought self-guide. These RTs were transformed by a logarithmic transformation. An overall ideal RT for each participant was calculated by adding together the three RTs related to each ideal self-guide attribute provided by the participant. The faster the overall RT for the ideal self-guide, the stronger the ideal self-guide and its promotion focus (see Higgins et al., 1997; Shah & Higgins, 1997). Similarly, an overall ought RT for each participant was calculated. This overall RT for each participant was calculated by adding together the three RTs related to each ought self-guide attribute provided by the participant. The faster the overall RT for the ought self-guide, the stronger the ought self-guide and its prevention focus (see Higgins et al., 1997; Shah & Higgins, 1997).

To divide participants in terms of chronic regulatory focus, we subtracted the mean RT for the ought strength measure from the mean RT for the ideal strength measure, so that high values indicate a predominant promotion focus and low values indicate a predominant prevention focus. The participants were divided on the basis of a median split into a predominant promotion focus group and a predominant prevention focus group.

Mood questionnaire. To measure the influences of the arm positions on mood change, we asked participants to indicate at different moments during the study their general current mood ("Right now, how do you feel?") on a 9-point rating scale ranging from 1 (*very bad*) to 9 (*very good*). Taking the participants' mood both increased the credibility of the cover story about physiological measures of emotions and motivation and allowed any effects of mood changes to be identified and statistically controlled for.

Evaluation of the arm positions. After having finished one set of anagrams, participants had to indicate the pleasantness of their arm positions ("How pleasant was the arm position to you?") on a 9-point rating scale ranging from 1 (*very unpleasant*) to 9 (*very pleasant*) and the effort of their arm positions ("How effortful was the arm position?") from 1 (*not very effortful*) to 9 (*very effortful*). These measures were included so that any possible effects the arm positions might have could be both measured and controlled for when statistically testing the predictions (see Förster & Strack, 1996, 1998).

The anagram task. Participants had to solve two sets of seven anagrams each, in which each anagram had more than one solution. These anagrams were pretested as being solvable by undergraduate participants in a pretest (on average, 98% gave at least one solution for each of the anagrams and 72% of the students gave more than one solution). Each anagram was presented for 90 s. During this 90-s time period, a sign appeared after 60 s, saying "***please press slightly***", and it stayed on the screen for 6 s. This sign reminded the participants to continue pressing on the metal plate of the skin conductance machine. For each set of anagrams, before each anagram appeared on the screen a sign announced its number (e.g., "***ANAGRAM # 6***") and remained on the screen for 6 s. The anagrams in one set were as follows: EACHP, ALSET, IKCTS, NELMO, ANETLM, OLSPO, and LEESTC. The anagrams in the other set were as follows: NIEDM, HRBOT, IDFEL, ULMPS, SDETRE, ILESM, and VEERL.

The skin conductance machine. To both increase the credibility of the cover story about physiological measures of motivation and sensitively measure arm pressure, we built a condensator machine such that higher capacity produced higher values on the machine's display. The machine consisted of a transportable digital display run by a battery that could be placed out of participants' sight, a copper loop that functioned as one half of the condensator, and a copper plate functioning as the other half. To obtain a measure of arm pressure, we had participants close the electric circuit by putting the pinkie of their right hand through the loop and by simultaneously placing their right palm on the copper plate. The copper plate was fixed with tape either on the bottom or on the top of a table that was approximately 70 cm in height. While pressing on the plate, the participants sat on a chair that was approximately 46 cm in height. The harder participants pressed on the plate, the more the

capacity increased, which produced higher values on the display. The values ranged from 130 to 700.

Procedure

Participants filled out the computerized self-guide measure in separate cubicles, each of which had its own computer. Up to 7 participants were run at a time. They were called back 4 months later and invited to participate in a physiological study on "new measures of emotions and motivation." Subsequent debriefing indicated that this cover story was successful in controlling participants' theorizing about the manipulated arm positions. Participants who agreed to participate were tested one at a time by experimenters who did not know the purpose of the study to avoid experimenter bias. When the experimenters were asked at the end of the study what they thought was the purpose of the study, both said they thought the study was about the absence of performance feedback.

Participants began by filling out the first mood questionnaire. They were then told in written instructions that their task was to find solutions for seven anagrams, each of which had more than one solution. They were told that the anagrams would be presented on a computer screen in front of them for about 90 s. They were also told that they would be connected to a newly invented machine to measure their skin conductance. Participants were connected to the skin conductance machine by the experimenter. Half of them began by pressing their right palm upward against the table (arm flexion), whereas the other half began by pressing their right palm downward against the table (arm extension). Beginning arm position was randomly assigned. There were no significant effects of order.

Participants were told to find a convenient palm position on the plate and to press slightly while solving the anagram task. To avoid participants' conscious control over their hand pressure, we put the display out of their sight. The experimenter sat near them and switched on the computer program of one of the anagram sets, whose order was randomly assigned. The experimenters were instructed to record the pressure from the display at the time the announcement of the next anagram appeared on the screen and to write down the anagram solutions given to them by the participants. They were also instructed to avoid either positive or negative feedback when solutions were given by the participants. After finishing the first set of anagrams, participants filled out the second mood questionnaire and the first questionnaire about their arm positions. To relax their arm muscles, the participants then worked on a 15-min filler task that involved filling out questionnaires unrelated to the study. After the filler task, the third mood questionnaire was completed. Participants then received the same instructions for the next anagram set, except that they were told they would perform the task in a different arm position. Consistent with the cover story, the new arm position was explained in terms of discovering the best arm position for measuring skin conductance. After connecting the participant to the skin conductance machine, the same procedure as for the first anagram set was followed.

After completing the second anagram set, the participants filled out the fourth mood questionnaire and the second questionnaire about their arm positions. They were then thanked by their experimenter and asked what they believed was the purpose of the study. All participants believed the cover story. None of them reported any hypotheses about the arm positions that were relevant to the true purpose of the study. The participants were then debriefed and thanked.

Results and Discussion

Our analyses addressed several issues. First, we investigated whether the different arm positions would influence participants' mood state differentially and whether they would be perceived differentially as pleasant or effortful. This analysis was important because these variables could potentially contribute to the predicted effects on the steepness of the approach and avoidance gradients. Second, we investigated whether regulatory focus would influence the overall arm pressure for arm flexion versus arm extension. This would also have implications for interpreting any differences in steepness of the approach and avoidance gradients. Third, we investigated the main hypothesis by analyzing the steepness of approach and avoidance gradients as a function of arm positions and regulatory focus. Finally, we investigated whether the number of correct anagram solutions would vary as a function of arm positions or regulatory focus as well as the interaction between these variables.

Mood

To test whether participants' mood changed during the experimental session as a function of arm position or strength of regulatory focus, we conducted repeated measures analyses of variance (ANOVAs) on mood changes. To determine mood changes, we computed differences between the first and the second mood questionnaire (Mood Rating 2 minus Mood Rating 1) and between the third and the fourth mood ratings (Mood Rating 4 minus Mood Rating 3). A positive value signified improvement of mood and a negative value worsening of mood. The mean differences of these ratings are presented in Table 1. Although participants who flexed their arm seemed to experience more mood worsening than those who extended their arm, the statistical analyses revealed that none of the main effects or the interaction between regulatory focus and arm position was significant ($Fs < 1$). When set order (first vs. second) was added as a within-subjects variable, there was no significant main effect and no significant interaction.

Table 1
Mean Ratings of Mood Changes, Effortfulness of the Arm Positions, and Pleasantness of the Arm Positions as a Function of Chronic Regulatory Focus and Arm Position

	Regulatory focus	
Arm position	Predominant promotion (n = 16)	Predominant prevention (n = 16)
	Mood changes	
Flexion	−0.63	−0.69
Extension	−0.31	−0.25
	Effort	
Flexion	7.0	6.6
Extension	4.1	4.3
	Pleasantness	
Flexion	2.5	2.3
Extension	5.0	4.4

Note. Mood changes were computed by subtracting Mood Rating 1 from Mood Rating 2 and by subtracting Mood Rating 3 from Mood Rating 4. Thus, positive scores indicate mood improvement and negative scores indicate mood worsening.

Effortfulness and Pleasantness of Arm Position

The same basic analysis used for mood was used to test effort and pleasantness of arm positions. For pleasantness of arm positions, this analysis revealed that participants rated the arm flexion position as being less pleasant than the arm extension position, as shown in Table 1, $F(1, 30) = 41.31$, $p < .001$. Regulatory focus did not influence the experience of pleasantness, $F(1, 30) = 1.15$, $p > .25$, and the interaction between regulatory focus and arm position was not significant ($F < 1$).

For effortfulness of arm position, arm flexion was rated as being more effortful than arm extension as shown in Table 1, $F(1, 30) = 21.10$, $p \leq .001$. Neither regulatory focus nor its interaction with arm position significantly influenced rated effort ($Fs < 1$). In summary, the arm positions were experienced differently, so that arm flexion was experienced as being more effortful and less pleasant than arm extension, but these effects did not interact with regulatory focus.

Overall Arm Pressure

Because of participants' chronic inclinations to approach or to avoid from their predominant regulatory focus, it is possible that independent of the distance to the goal, they generally would press harder in compatible conditions (arm extension with strong prevention focus and arm flexion with strong promotion focus) than in incompatible conditions (arm extension with strong promotion focus and arm flexion with strong prevention focus). To test this possibility, the seven mean pressure values recorded by the experimenters for each set of anagrams were first added and divided by seven, and then compared in a 2 (regulatory focus) × 2 (arm position) repeated measures ANOVA for the two sets of anagrams. The mean values for overall pressure as a function of arm position and regulatory focus are presented in Table 2. The analysis revealed a borderline significant tendency to press harder under arm extension than under arm flexion, $F(1, 30) = 3.03$, $p < .10$. Neither the main effect of regulatory focus nor its interaction with arm position was significant ($Fs < 1$). Thus, regulatory focus did not predict the overall arm pressure. The question remains, however, whether regulatory focus, as predicted, did influence arm pressure as a function of the distance to the goal. We now turn to this major prediction of the study.

Steepness of the Gradients

To provide an initial insight into the obtained data, we computed two curves for approach (arm flexion) and avoidance (arm extension), as presented in Figures 1A and 1B. These figures show the mean pressure values recorded by the experimenters over each set of seven anagrams for each of the arm positions, separately for participants with either a predominant promotion focus or a predominant prevention focus. As shown in Figure 1A, the approach gradient was steeper for participants with a predominant promotion focus than for participants with a predominant prevention focus. However, as shown in Figure 1B, the avoidance gradient was steeper for participants with a predominant prevention focus than for participants with a predominant promotion focus.

Table 2
Mean Arm Pressure as a Function of Chronic Regulatory Focus and Arm Position

	Regulatory focus	
Arm position	Predominant promotion ($n = 16$)	Predominant prevention ($n = 16$)
Flexion	533.55	501.17
Extension	562.48	568.88

For each individual participant, we conducted two separate curve analyses for approach pressure (arm flexion) and avoidance pressure (arm extension) over the seven recorded values for each set of anagrams, from the first to the last anagram. Thus, each participant was assigned his or her slope coefficient for the arm position of approach and the arm position of avoidance, reflecting the steepness of approach gradient and the steepness of avoidance gradient, respectively. Positive values indicated increasing arm pressure and a rising gradient, and negative values indicated descending arm pressure and a falling gradient. The slope coefficients for each condition were used as the main dependent variable in the study and are presented in Table 3.

As shown in Table 3, the avoidance gradient was steeper overall than the approach gradient, $F(1, 30) = 12.58$, $p = .001$. The main effect of regulatory focus was not significant ($F < 1$). As predicted, however, there was a significant Regulatory Focus × Approach–Avoidance Gradient interaction, $F(1, 30) = 8.56$, $p = .006$, reflecting the fact that the approach gradient was steeper for participants with a predominant promotion focus than a predominant prevention focus, whereas the avoidance gradient was steeper for participants with a predominant prevention focus than a predominant promotion focus. To determine whether this interaction was due simply to differences in participants' initial strength of approach motivation, we included the first approach pressure value for arm flexion on the first anagram and the first avoidance pressure value for arm extension on the first anagram as covariates in the design. The interaction remained highly significant. A posteriori Scheffé tests (5%) revealed that the difference between approach and avoidance gradients was statistically significant for a predominant prevention focus and was nonsignificantly in the predicted direction for a predominant promotion focus. Because a median split might have been a slightly insensitive procedure for distinguishing between a chronic promotion versus chronic prevention focus, we conducted additional analyses in which the ideal and ought strength measures were used as continuous variables.

To examine the effects of strength of focus on approach and avoidance gradients, we conducted two multiple linear regression analyses. The difference between the steepness of the approach gradient and the steepness of the avoidance gradient was the dependent variable (slope coefficient of arm flexion minus slope coefficient of arm extension). Thus, higher values indicated that the approach gradient was steeper than the avoidance gradient, whereas lower values meant the opposite. Ideal strength and ought strength were the independent continuous variables. This analysis, summarized in Table 4, revealed a strong positive correlation between ideal strength (controlling

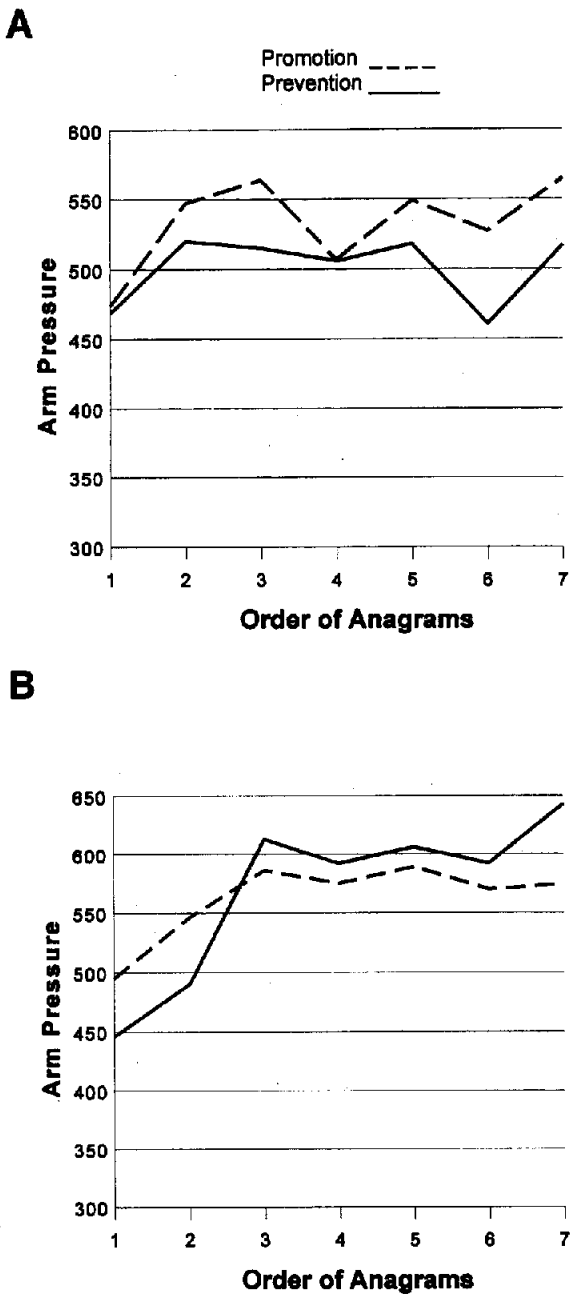

Figure 1. A: Approach gradients as a function of regulatory focus (predominant promotion vs. predominant prevention) in Study 1. B: Avoidance gradients as a function of regulatory focus (predominant promotion vs. predominant prevention) in Study 1.

for ought strength) and the difference between the approach and avoidance gradients, $B = 6.40$, $t(30) = 3.09$, $p = .004$, and a strong negative correlation between ought strength (controlling for ideal strength) and the difference between approach and avoidance gradients, $B = -4.88$, $t(30) = -2.71$, $p = .011$. Thus, as the strength of the participants' prevention focus increased, the avoidance gradient was steeper than the approach gradient. In contrast, as the strength of participants' promotion focus increased, the approach gradient was steeper than the avoidance gradient.

Table 3
Mean Slope Coefficients as a Function of Chronic Regulatory Focus and Arm Position

	Regulatory focus	
Arm position	Predominant promotion ($n = 16$)	Predominant prevention ($n = 16$)
Flexion (approach)	7.78	−0.44
Extension (avoidance)	10.53	28.16

Do arm flexion–arm extension differences in overall arm pressure, mood change, effort of arm position, pleasantness of arm position, or anagram performance predict differences in approach and avoidance gradients? To control for these possible mediators, we also entered the following variables into the regression analysis.

1. The difference in overall arm pressure was the difference between participants' mean pressure of arm flexion and arm extension and was obtained by subtracting the mean pressure for arm extension over the seven anagrams from the mean pressure of arm flexion over the seven anagrams. Positive values indicate that the total pressure was higher in the approach arm position than in the avoidance arm position, whereas negative values signify that the total pressure was higher in the avoidance position than in the approach position.

2. The difference in effort was obtained by subtracting the ratings of effort for arm extension from the ratings of effort for arm flexion. Positive values signify that the effort ratings were higher for the approach arm position than for the avoidance arm position, whereas negative values signify that the effort ratings were higher for the avoidance position than for the approach position.

3. The difference in pleasantness was obtained by subtracting the pleasantness ratings for arm extension from the pleasantness ratings for arm flexion. Positive values signify that the pleasantness ratings were higher for the approach arm position than for the avoidance arm position, whereas negative values signify that the pleasantness ratings were higher for the avoidance position than for the approach position.

Table 4
Simultaneous Regression Analysis for Variables Predicting the Difference Between Steepness of the Approach and Avoidance Gradients

Variable	*B*	*SE B*	*β*	*t*	*p*
Ideal strength	6.40	2.07	.583	3.09	.004
Ought strength	−4.88	1.80	−.511	−2.71	.011

Note. Higher ideal (ought) strength reflects higher accessibility of ideal (ought) self-guide.

4. The difference in mood changes was obtained by subtracting the mood changes for arm extension from the mood changes for arm flexion. Higher values signify that mood improvement was higher in the approach arm position than in the avoidance arm position, whereas lower values signify that mood improvement was higher in the avoidance position than in the approach position.

5. The difference in performance was the difference between the performance under arm flexion and arm extension and was obtained by subtracting the mean number of correct anagram solutions under arm extension from the mean number of correct anagram solutions under arm flexion. Higher values indicate that the number of correct solutions was higher in the approach arm position than in the avoidance arm position, whereas lower values indicate that the number of correct solutions was higher in the avoidance position than in the approach position.

As shown in Table 5, even controlling for these mediators, there was still a positive correlation between ideal strength and the difference between approach and avoidance steepness, $B = 5.53$, $t(24) = 2.43$, $p = .023$, and a negative correlation between ought strength and the difference between approach and avoidance steepness, $B = -4.47$, $t(24) = -2.33$, $p = .028$. No other variables correlated significantly with the differential steepness ($ts < 1.63$, $ps > .117$).

Performance on the Anagrams

Using the arm positions as an independent variable makes it possible to test another question related to regulatory focus: Does compatibility between promotion versus prevention focus goals and approach and avoidance motor responses improve anagram performance? To answer this question, we added the mean number of correct solutions for the seven anagrams that were solved either under arm flexion or under arm extension and entered them into a 2 (regulatory focus) × 2 (arm position) repeated measures ANOVA, in which the first factor was between subjects and the second was within subjects. The data are presented in Table 6. As shown in Table 6, participants with a predominant promotion focus gave more correct solutions under arm flexion (approach) than under arm extension (avoidance), whereas the reverse was true for participants with a predominant prevention focus, producing a significant crossover interaction, $F(1, 30) = 5.47$, $p = .03$. Neither of the main effects was significant ($Fs < 1$).

Table 5
Summary of Simultaneous Regression Analysis for Variables Predicting the Difference Between Steepness of the Approach and Avoidance Gradients

Variable	*B*	*SE B*	*β*	*t*	*p*
Ideal strength	5.53	2.28	.503	2.43	0.023
Ought strength	−4.47	1.92	−.469	−2.33	0.028
Pressure	0.01	0.03	.037	0.21	0.836
Effort	−3.48	2.14	−.390	−1.63	0.117
Pleasantness	−3.89	3.46	−.277	−1.13	0.272
Mood	−0.88	2.08	−.072	−0.42	0.677
Performance	0.65	0.74	.153	0.89	0.386

Note. Higher ideal (ought) strength reflects higher accessibility of ideal (ought) self-guides. Higher pressure scores, effort scores, pleasantness scores, mood improvement scores, and performance scores reflect higher scores under arm flexion than under arm extension.

Table 6
Mean Number of Correct Anagram Solutions as a Function of Chronic Regulatory Focus and Arm Position

	Regulatory focus	
Arm position	Predominant promotion ($n = 16$)	Predominant prevention ($n = 16$)
Flexion (approach)	14.50	10.88
Extension (avoidance)	12.13	13.56

In summary, the results of Study 1 support our major hypothesis that regulatory focus predicts the difference between the steepness of an approach gradient and the steepness of an avoidance gradient when working to attain a goal. In Study 1 we tested this hypothesis for chronic regulatory focus. A second study was designed to test this hypothesis for situationally induced regulatory focus. In Study 2 we used a framing technique (see Higgins et al., 1997) to experimentally induce either a promotion or a prevention focus. In Study 2 we also tested for possible effects of the valence of the framing (i.e., positive vs. negative framing). We predicted that participants with a promotion focus would show a steeper approach than avoidance gradient, whereas participants with a prevention focus would show a steeper avoidance than approach gradient, independent of whether the framing was positive (self-regulation working) or negative (self-regulation not working).

Study 2

Method

Participants

The participants were 60 Columbia undergraduates (39 women and 21 men) who were called back from a survey pool and who had agreed to participate. They were tested one at a time and received $8 for their participation. Gender did not moderate any of the significant effects reported in these analyses.

Procedure

The procedure of Study 2 basically replicated Study 1, except that the participants were randomly assigned to different framing conditions rather than being selected for their predominant regulatory focus. Beginning arm position was again randomly assigned, and again there were no significant effects of order. The framing manipulations occurred before the first set and before the second set of anagrams, with each participant remaining in the same framing condition for both sets of anagrams. The framing manipulated regulatory focus and valence as follows.

1. Promotion working: "For this set of anagrams, we want you to

find 90% or more of all possible words. If you find 90% or more of all possible words, you will get an extra dollar."

2. Promotion not working: "For this set of anagrams, we want you to find 90% or more of all possible words. If you don't find 90% or more of all possible words, you will not get an extra dollar."

3. Prevention working: "For this set of anagrams, we want you not to miss 10% or more of all possible words. If you don't miss 10% or more of all possible words, you will not lose a dollar."

4. Prevention not working: "For this set of anagrams, we want you not to miss 10% or more of all possible words. If you miss 10% or more of all possible words, you will lose a dollar."

Results

Differences among the four framing conditions were examined by including two different framing variables in the analyses. The first framing variable was regulatory focus, distinguishing between promotion focus (promotion working and promotion not working) and prevention focus (prevention working and prevention not working). The second framing variable was valence, distinguishing between positive valence conditions (promotion working and prevention working) and negative valence conditions (promotion not working and prevention not working). The third factor was the within-subjects factor of arm position (arm flexion vs. arm extension). The results were analyzed as in Study 1. We first investigated the influence of both framing variables and arm position on mood and experiences of the arm positions. We then analyzed the influence of these three variables on overall arm pressure and the steepness of the approach and avoidance gradients. Finally, we investigated the influence of these three variables on anagram performance. As in Study 1, set order was entered in all of the analyses and revealed no significant main effects or significant interactions.

Mood

The mean ratings for mood changes (the first mood rating subtracted from the second and the third mood rating subtracted from the fourth) are presented in Table 7. Neither of the main effects nor any of the two- or three-way interactions were significant ($Fs < 1.55$, $ps > .20$).

Effortfulness and Pleasantness of Arm Positions

As in Study 1, and as shown in Table 7, arm flexion ($M = 2.62$) was rated as being less pleasant than arm extension ($M = 3.75$), $F(1, 56) = 14.72$, $p < .0001$. No other main effects or two-way interactions were significant ($Fs < 1$). The three-way interaction was also nonsignificant, $F(1, 56) = 2.50$, $p > .10$.

Also as in Study 1, and shown in Table 7, arm flexion ($M = 6.72$) was rated as being more effortful than arm extension ($M = 5.82$), $F(1, 56) = 7.10$, $p = .01$. No other main effects or interactions were significant ($Fs < 1.2$, $ps > .27$). In summary, these results replicate the findings of Study 1, in which arm flexion was experienced as being more effortful and less pleasant than arm extension, but these effects did not interact with regulatory focus, and in which the two arm positions did not produce mood changes.

Table 7
Mean Ratings of Mood Changes, Effortfulness of the Arm Positions, and Pleasantness of the Arm Position as a Function of Regulatory Focus, Valence, and Arm Position

	Regulatory focus			
	Promotion focus		Prevention focus	
Arm position	Working ($n = 15$)	Not working ($n = 15$)	Working ($n = 15$)	Not working ($n = 15$)
	Mood changes			
Flexion	−0.33	−0.53	−0.13	−0.60
Extension	0.07	−0.20	−0.20	−0.27
	Effort			
Flexion	6.87	6.33	7.27	6.40
Extension	6.27	5.60	5.53	5.87
	Pleasantness			
Flexion	2.93	2.20	2.33	3.00
Extension	3.53	4.27	3.47	3.73

Note. Mood changes were computed by subtracting the rating of Mood Question 1 from Mood Question 2 and by subtracting the rating of Mood Question 3 from Mood Question 4. Thus, positive scores indicate mood improvement and negative scores indicate mood worsening.

Overall Arm Pressure

As in Study 1, the seven measures of arm pressure were added for each of the arm positions and divided by 7, respectively. The results are summarized in Table 8. As shown in Table 8, participants pressed harder under arm extension than under arm flexion, $F(1, 56) = 4.53$, $p = .04$, replicating the findings of Study 1. As also shown in Table 8, the participants in the promotion working framing condition pressed harder ($M = 566.09$) than did participants in the promotion not-working condition ($M = 463.18$), whereas participants in the prevention not-working condition pressed harder ($M = 583.47$) than did participants in the prevention working condition ($M = 505.15$). This intriguing finding was reflected in a significant interaction between regulatory focus and valence, $F(1, 56) = 7.02$, $p = .01$. No other main effects or interactions were significant ($Fs < 1$). This interaction may reflect differences in motivational intensities as a function of regulatory focus and regulatory anticipation (see Higgins, 1997; Higgins, Grant, & Shah, in press). Specifically, participants with a promotion focus may be especially eager when they imagine the pleasant outcome of promotion working, whereas participants with a prevention focus may be especially vigilant when they imagine the painful outcome of prevention not working.

Steepness of the Gradients

The mean pressure measures that were recorded by the experimenters for each framing condition from the first to the last

Table 8
Mean Arm Pressure as a Function of Regulatory Focus, Valence, and Arm Position

	Regulatory focus			
	Promotion focus		Prevention focus	
Arm position	Working (n = 15)	Not working (n = 15)	Working (n = 15)	Not working (n = 15)
Flexion	553.30	441.11	482.76	559.71
Extension	578.88	485.25	527.53	607.22

anagram are shown in Figure 2A for the approach gradients (arm flexion) and in Figure 2B for the avoidance gradients (arm extension). As shown in the figure, the approach gradient was steeper for participants in the promotion framing conditions than for participants in the prevention framing conditions, whereas the avoidance gradient was steeper for participants in the prevention framing conditions than for participants in the promotion framing conditions.

As in Study 1, approach and avoidance slope coefficients for each participant were calculated and are summarized in Table 9. As shown in Table 9, within arm flexion, the approach gradient was steeper for participants in the promotion framing conditions (M = 24.71) than for participants in the prevention focus conditions (M = 1.34), whereas within arm extension, the avoidance gradient was steeper for participants in the prevention framing conditions (M = 20.31) than for participants in the promotion framing conditions (M = −0.08), yielding a highly significant two-way interaction between arm position and regulatory focus, $F(1, 56) = 14.01$, $p < .0001$. A posteriori Scheffé tests (5%) revealed that the regulatory focus differences for both the approach gradient and the avoidance gradient were significant. As in Study 1, the first approach pressure value for arm flexion on the first anagram and the first avoidance pressure value for arm extension on the first anagram were both included as covariates in the design. The interaction remained highly significant.

The interaction between regulatory focus and valence was nonsignificant, $F(1, 56) = 1.69$, $p = .20$, as were all other effects (Fs < 1). Thus, regulatory focus framing had a strong effect on approach and avoidance gradients that was independent of valence. In contrast, valence alone had no effect.

Similar to Study 1, we conducted a regression analysis to check whether the differences in the steepness of the gradients were mediated by other variables. The full model consisted of the difference between the steepness coefficients of approach minus the steepness coefficients of avoidance as the dependent variable and the following independent variables: (a) induced regulatory focus (as a dummy variable, in which 1 indicated promotion focus and 2 indicated prevention focus); (b) valence (as a dummy variable, in which 1 indicated a positive valence and 2 indicated a negative valence); (c) differences in mood changes; (d) differences in effort; (e) differences in pleasantness; (f) differences in overall pressure; and (g) differences in the correct anagram solutions (the last five variables were computed as in Study 1).

The results of this model are presented in Table 10. As shown in Table 10, there were only two variables that contributed significantly to the overall effect. First, controlling for all the above mediators, regulatory focus had the strongest effect, B =

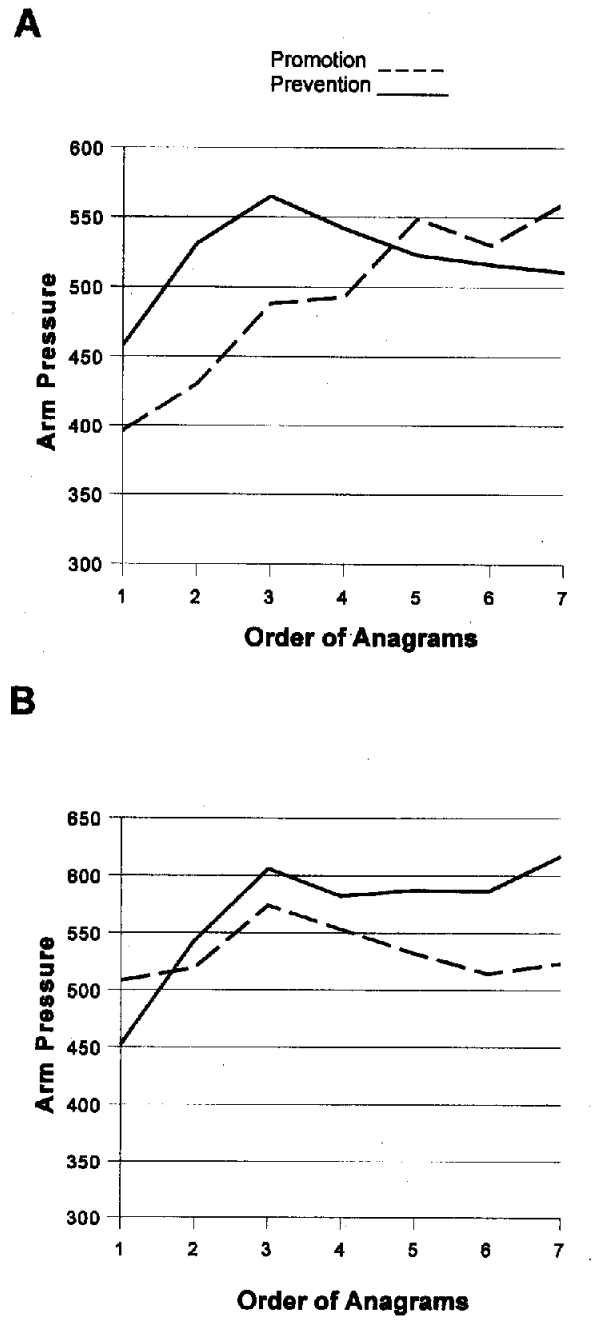

Figure 2. A: Approach gradients as a function of regulatory focus (promotion framing vs. prevention framing) in Study 2. B: Avoidance gradients as a function of regulatory focus (promotion framing vs. prevention framing) in Study 2.

Table 9
Mean Slope Coefficients as a Function of Regulatory Focus, Valence, and Arm Position

	Regulatory focus			
	Promotion focus		Prevention focus	
Arm position	Working (n = 15)	Not working (n = 15)	Working (n = 15)	Not working (n = 15)
Flexion (approach)	15.47	33.94	2.02	0.65
Extension (avoidance)	−1.94	1.77	24.63	15.99

−44.30, $t(52) = -3.69$, $p < .001$. In contrast, valence had no significant effect, $B = 17.63$, $t(52) = 1.44$, $p > .15$. As the only other significant predictor, the difference between the mean overall arm pressure of approach versus avoidance was positively correlated with the difference between the steepness of approach and avoidance, $B = 0.10$, $t(52) = 2.48$, $p = .017$, indicating that the harder participants flexed their arms compared with extending them overall, the approach gradient was steeper than the avoidance gradient. No other variables significantly influenced the dependent variable ($ts < 1.11$, $ps > .25$).

In summary, the regression analysis revealed that the influence of regulatory focus on approach and avoidance gradients was independent of overall arm pressure. Mood changes, effort of the arm positions, pleasantness of the arm positions, and anagram performance also did not mediate the regulatory focus effect.

Performance on the Anagram Task

As an extension to Study 1, it was now possible to distinguish between two versions of compatibility. On the one hand, we could again examine how the compatibility between regulatory focus and the motor response would influence performance on the anagram task, as was tested in Study 1. On the other hand, we could examine for the first time how compatibility between the valence of the outcome and the motor response would influence anagram performance.

Anagram performance as a function of regulatory focus, valence, and arm position is presented in Table 11. A 2 (regulatory focus) × 2 (valence) × 2 (arm position) repeated measures ANOVA was performed on the number of correct anagram solutions. As shown in Table 11 and consistent with the results of Study 1, participants in the promotion framing conditions found more anagram solutions while performing the approach arm flexion behavior ($M = 15.83$) than the avoidance arm extension behavior ($M = 13.63$), whereas participants in the prevention framing conditions found more anagram solutions while performing the avoidance arm extension behavior ($M = 14.63$) than the approach arm flexion behavior ($M = 13.23$), resulting in a significant two-way interaction between regulatory focus and arm position, $F(1, 56) = 5.60$, $p = .02$. Thus, as in Study 1, anagram performance was better when there was a compatibility between regulatory focus and arm position with respect to approach and avoidance inclinations.

Also as shown in Table 11, participants in the positive valence framing conditions found more anagram solutions overall while performing the approach arm flexion behavior ($M = 15.40$) than the avoidance arm extension behavior ($M = 13.23$), whereas participants in the negative valence framing conditions found more anagram solutions overall while performing the avoidance arm extension behavior ($M = 15.03$) than the approach arm flexion behavior ($M = 13.67$), resulting in a significant two-way interaction between valence and arm position, $F(1, 56) = 5.39$, $p = .02$. There were no other significant effects ($Fs < 1.9$, $ps > .15$). Most important, the three-way interaction among regulatory focus, valence, and arm position was nonsignificant, $F(1, 56) = 1.84$, $p > .15$.

These performance results suggest that compatibility between the approach versus avoidance orientations of the actor and the approach versus avoidance responses required by the motor task enhances performances. In the first two studies, compatibility between regulatory focus and approach and avoidance motor responses (i.e., promotion focus and arm flexion, prevention focus and arm extension) led to better performance on the anagram task than did incompatibility (i.e., promotion focus and arm extension, prevention focus and arm flexion). These results extend the results by Shah et al. (1998) described earlier. In

Table 10
Simultaneous Regression Analysis for Variables Predicting the Difference Between Steepness of the Approach and Avoidance Gradients

Variable	*B*	*SE B*	*β*	*t*	*p*
Regulatory focus	−44.30	12.02	−.45	−3.69	0.001
Valence	17.63	12.25	.18	1.44	0.156
Pressure	0.10	0.04	.29	2.48	0.017
Effort	3.14	2.82	.16	1.11	0.270
Pleasantness	3.13	3.17	.15	0.99	0.328
Mood	−2.95	3.82	−.09	−0.77	0.433
Performance	0.49	0.98	.06	0.50	0.622

Note. In this analysis, the variable of regulatory focus was entered as a dummy variable, in which 1 = promotion focus and 2 = prevention focus. Valence was entered as a dummy variable, in which 1 = working (or positive) and 2 = not working (or negative). Higher pressure scores, effort scores, pleasantness scores, mood improvement scores, and performance scores reflect higher scores under arm flexion than under arm extension.

Table 11
Mean Number of Correct Anagram Solutions as a Function of Regulatory Focus, Valence, and Arm Position

	Regulatory focus			
	Promotion focus		Prevention focus	
Arm position	Working (n = 15)	Not working (n = 15)	Working (n = 15)	Not working (n = 15)
Flexion (approach)	17.27	14.40	13.53	12.93
Extension (avoidance)	12.27	15.00	14.20	15.07

addition, as found in Study 2, compatibility between approach and avoidance responses and the valence of framing enhanced performance, replicating and extending previous results by Förster and Strack (1996), who found that compatibility between the valence of an expressive behavior (head shaking vs. nodding) and the valence of input information produced better recognition performance than incompatibility.

Study 3

The results of Studies 1 and 2 demonstrate that the goal looms larger effect occurs for both strategic approach *and* strategic avoidance motivation, depending on regulatory focus. For individuals in a promotion focus, strategic approach motivation increased as they worked on problems closer to attaining the goal. For individuals in a prevention focus, strategic avoidance motivation increased as they worked on problems closer to attaining the goal. These effects were found for regulatory focus both as a personality variable and as experimentally induced. Thus, motivational strength does increase as performers move closer to the goal, as suggested by Lewin (1935) and Miller (1944). The approach–avoidance strategic nature of this motivation, however, depends on the regulatory focus of the performer. To bolster this conclusion, we wanted to replicate our results with an alternative measure of motivational strength. In Studies 1 and 2 we used intensity as the measure of motivational strength. Therefore, in Study 3 we used a different measure of motivational strength: persistence.

A classic measure of motivational strength is persistence, which is defined as the length of time a person chooses to work on a problem (see Weiner, 1972). In Study 3 we measured each participant's response duration on each anagram problem (i.e., how long they worked on each anagram). The goal looms larger effect generally predicts that persistence in working on anagrams will increase as performers move closer to the goal. That is, participants' response duration should be longer on later anagrams than on earlier anagrams. According to regulatory focus theory, however, and consistent with the results of Study 1 and 2, we would also predict that this stronger persistence as the goal looms larger will depend on the performers' regulatory focus and the strategic approach–avoidance nature of the anagrams.

Study 3 was designed to examine regulatory focus both as a personality variable and as experimentally induced. To have separate strategic approach and strategic avoidance problems in the task, we used the experimental procedure from a study by Shah et al. (1998). In their study, the participants worked on a set of anagrams that contained both green and red anagrams. For the green anagrams, a participant "gained a point" each time an anagram was solved, and thus the green anagrams involved strategic approach motivation for goal attainment. For the red anagrams, a participant "avoided losing a point" each time an anagram was solved, and thus the red anagrams involved strategic avoidance motivation for goal attainment.

There were an equal number of red and green anagrams in the set, and both types of anagrams appeared early, middle, and late in the set. Thus, one could test the goal looms larger effect separately for the green anagrams subset and the red anagrams subset. We predicted that for strategic approach strength, as measured by persistence on the green anagrams, the goal looms larger effect of greater persistence on later than earlier green anagrams would be stronger for individuals in a promotion focus than a prevention focus. For strategic avoidance strength, as measured by persistence on the red anagrams, we predicted that the goal looms larger effect of greater persistence on later than earlier red anagrams would be stronger for individuals in a prevention focus than a promotion focus.

In Study 3, then, we tested the predictions that longer response duration on later than earlier green anagrams would be more evident for individuals in a promotion focus than a prevention focus and that longer response duration on later than earlier red anagrams would be more evident for individuals in a prevention focus than a promotion focus. These predictions were tested for regulatory focus both as a personality variable and as experimentally induced. In Study 3 we also measured participants' performance expectancies to rule out the possibility that differences in expectancies of success or failure, either chronically or experimentally induced, contributed to our motivational strength findings.

Method

Overview

Participants completed the computerized self-guide measure as described in Study 1. Five or more days later, they were called back for the anagram task. Participants were told that payment depended on their performance. They were randomly assigned to two framing conditions. The promotion framing condition framed the performance contingency as an opportunity to gain extra money or not, whereas the prevention framing condition framed the performance contingency as a risk of losing money or not. Unlike in Study 2, the valence of the framing was not a separate variable. Instead, both positive and negative possible outcomes were included in each framing condition.

Participants were also told that there were two types of anagrams to be solved, both red and green anagrams. For each green anagram for which they found all the possible solutions, they would gain a point. For each red anagram for which they found all the possible solutions, they would not lose a point. Participants completed an equal number of red and green anagrams. The time participants spent working on each anagram (i.e., response duration) served as the main dependent measure of persistence.

Participants

Eighty Columbia University students (38 men and 42 women) were asked to participate in a two-session study on "psychological processes." They were paid a total of $9 for their participation in both sessions. Three participants were excluded because they did not answer all the questions. Participants were run on separate Macintosh PC computers in separate soundproof chambers. Gender did not moderate any of the significant effects reported in these analyses.

Materials

In Session 1 of the study, the same self-guide strength measure was used as in Study 1 and ideal and ought strength was calculated in the same manner as in Study 1. In Session 2, three practice anagrams were first presented in black (EACHP, ALSET, and IKCTS), followed by 10

red and green anagrams in the following order (the green anagrams are shown in italics, and the red anagrams are shown in nonitalics): *NELMO*, ANETLM, *ILESM*, *OLSPO*, LEESTC, *NIEDM*, HRBOT, IDFEL, *RTNIPS*, and OSLCD.

Procedure

In Session 1 of the study, participants completed the self-guide strength measure as described in Study 1 and were scheduled afterward for the second session. They were told that they would be paid for the two sessions after they had completed the second session. Participants returned 5 or more days later for Session 2 and were directed to separate computer terminals, where they were given a description of the anagram task they would be performing. They were told that the task involved unscrambling a series of letters to form as many words as possible using all the letters in the series. They were told that they had as much time as they needed to complete each anagram. Participants were then given three practice anagrams (presented in black) to familiarize themselves with the task. After completing the practice anagrams, they were randomly assigned to one of the two framing conditions. In both framing conditions, the participants were told that they would be asked to solve 5 red and 5 green anagrams. They were told that, for each of the green anagrams, if they found all of the possible words they would gain one point but that if they failed to find all of the possible words they would not gain a point. They were also told that, for each of the red anagrams, if they found all of the possible words they would not lose a point but that if they failed to find all of the possible words they would lose a point.

All the participants were then led to believe that the computer would convert their score on all 10 anagrams to a percentile score relative to other Columbia students who had participated in the experiment. They were told that their payment was contingent on their performance, but this task contingency information was framed differently across the promotion framing and prevention framing conditions. In the promotion framing condition, the participants were told that they would be paid 8 dollars for the two sessions, but that there was the possibility of gaining a dollar. If they scored at or above the 70th percentile, they would gain a dollar, but if they failed to score at or above the 70th percentile, they would not gain a dollar. In the prevention framing condition, the participants were told that they would be paid 9 dollars for the two sessions, but that there was the possibility of losing a dollar. If they scored at or above the 70th percentile, they would not lose a dollar, but if they failed to score at or above the 70th percentile, they would lose a dollar.

Participants' performance expectancies were measured immediately after the framing manipulation by asking each participant to rate the likelihood that she or he would finish at or above the 70th percentile. This estimation was made on a 9-point rating scale ranging from 1 (*not at all likely*) to 9 (*extremely likely*). Participants then completed the set of 10 anagrams (5 green and 5 red), which were presented on a computer screen. Participants were informed that the anagrams had no, one, or more solutions and that if they thought that there were no solutions or no more solutions they should go on by pressing a specific button on the computer keyboard. After completing the task, participants were told the nature of the study in a thorough debriefing. The dependent measure was the time participants spent on solving each anagram (i.e., response duration), as a measure of persistence.

Results and Discussion

Expectancies

Expectancies neither differed between the two framing conditions (promotion mean = 5.32, prevention mean = 5.64; $t <$ 1) nor between the two groups as defined by the median split of predominant promotion or predominant prevention focus (promotion mean = 5.36, prevention mean = 5.61; $t < 1$).

Table 12
Mean Slope Coefficients as a Function of Regulatory Focus Framing and Red and Green Anagrams

Anagram	Regulatory focus framing: Promotion focus (n = 38)	Regulatory focus framing: Prevention focus (n = 39)
Green (strategic approach)	.047	−.046
Red (strategic avoidance)	−.033	.033

Persistence

Our major prediction was that longer response durations on later than earlier green anagrams would be more evident for individuals in a promotion focus than a prevention focus. We also predicted that longer response durations on later than earlier red anagrams would be more evident for individuals in a prevention focus than a promotion focus.

The response durations can be influenced by extraneous general factors, such as practice in solving anagrams. To control for any possible effects of such extraneous general factors, we z transformed the raw response time participants spent on each single anagram across participants. Then, individual slope coefficients were calculated for response durations from early to late anagrams, for the red anagrams and the green anagrams separately. The mean slope coefficients are presented in Table 12 as a function of promotion versus prevention framing independent of predominant regulatory focus as a person variable and in Table 13 as a function of predominant promotion and predominant prevention focus independent of regulatory focus framing. (Predominant promotion or prevention focus was measured in the same way as Study 1.)

As can be seen from Table 12, participants with a situationally induced promotion focus spent relatively more time on later than earlier green anagrams (strategic approach) compared with participants with an induced prevention focus. In contrast, participants in a prevention focus spent relatively more time on later than earlier red anagrams (strategic avoidance) compared with participants with an induced promotion focus. A 2 × 2 ANOVA revealed, as predicted, a significant crossover interaction between the two factors, $F(1, 75) = 6.98$, $p = .01$. The main effects were not significant (Fs < 1). A posteriori Scheffé tests (5%) revealed that the differences between and within regulatory focus framing conditions were significant. That is, within promotion focus framing, the slope coefficients were significantly more positive for the green anagrams (strategic approach) than for the red anagrams (strategic avoidance), and the reverse effect was significant within prevention focus framing. Furthermore, for the green anagrams, the slope coefficients were significantly more positive for promotion focus framing than for prevention focus framing, and the reverse effect was significant for the red anagrams. These results support our pre-

Table 13
Mean Slope Coefficients as a Function of Chronic Regulatory Focus and Red and Green Anagrams

Anagram	Chronic regulatory focus: Predominant promotion (n = 39)	Chronic regulatory focus: Predominant prevention (n = 38)
Green (strategic approach)	.066	−.068
Red (strategic avoidance)	−.036	.037

diction that the goal looms larger effect of greater persistence on later than earlier anagrams would be stronger for individuals in a promotion focus than a prevention focus for the green anagrams (strategic approach) and would be stronger for individuals in a prevention focus than a promotion focus for the red anagrams (strategic avoidance).

In Table 13, a similar pattern can be observed with the median split of chronic promotion focus versus chronic prevention focus (see Study 1). Predominant promotion focus led to a higher increase in persistence the closer a green anagram was to the goal, whereas predominant prevention focus led to a higher increase in persistence the closer a red anagram was to the goal. As with the framing variable, the crossover interaction was highly significant, $F(1, 75) = 12.69$, $p < .001$, and the two main effects were not significant (Fs < 1). The described differences between and within the conditions were significant, as shown by Scheffé tests (5%). That is, for predominant promotion individuals, the slope coefficients were significantly more positive for the green anagrams (strategic approach) than for the red anagrams (strategic avoidance), and the reverse effect was significant for predominant prevention individuals. Furthermore, for the green anagrams, the slope coefficients were significantly more positive for predominant promotion than predominant prevention individuals, and the reverse effect was significant for the red anagrams. Once again, these results support our prediction that the goal looms larger effect of greater persistence on later than earlier anagrams would be stronger for individuals in a promotion focus than a prevention focus for the green anagrams (strategic approach) and would be stronger for individuals in a prevention focus than a promotion focus for the red anagrams (strategic avoidance).

To examine more thoroughly the effects of chronic strength of focus on the approach versus avoidance persistence slope coefficients, we conducted two multiple linear regression analyses. The difference between the slope coefficient for the green anagrams and the slope coefficient for the red anagrams was the dependent variable (green minus red). Thus, higher values signified a relatively steeper approach gradient than avoidance gradient, whereas lower values signified the opposite. This analysis, as summarized in Table 14, revealed a strong positive correlation between ideal strength (controlling for ought strength) and the difference between the approach and avoidance slope coefficients, $B = 0.041$, $t(77) = 2.28$, $p = .025$, and a strong negative correlation between ought strength (controlling for ideal strength) and the difference between the approach and avoidance slope coefficients, $B = -0.048$, $t(77) = 3.58$, $p < .001$. Thus, as the strength of participants' promotion focus increased, the relative approach gradient was steeper than the relative avoidance gradient. In contrast, as the strength of participants' prevention focus increased, the relative avoidance gradient was steeper than the relative approach gradient.

To control for the possible influence of other variables that could have mediated the effects, we also included the expectancy ratings, performance on the red anagrams, and performance on the green anagrams in the analyses (see Table 15). As can be seen from Table 15, the observed correlations were not affected by these additional variables.

Performance on the Anagram Task

Using the mean number of anagram solutions as a dependent variable yielded two reliable effects. Unexpectedly, the number of anagram solutions was higher for the green anagrams (M = 10.1) than the red anagrams (M = 5.5), $t(76) = 16.94$, $p <$ .0001. This difference made it less likely that other performance effects would be obtained in this study. There was, however, a general effect on overall performance (across both sets of anagrams) due to participants' ideal or ought strength. Replicating former studies (Roney, Higgins, & Shah, 1995), participants with a predominant promotion focus found more solutions (M = 16.76) than did participants with a predominant prevention focus (M = 14.42), $t(75) = 2.25$, $p < .05$. Note that these differences in performance did not affect the differences on the persistence measure because we statistically controlled for any such influence of performance.

General Summary and Conclusions

The results of all three studies support the conclusion that the type of motivation that increases as people move closer to goal attainment depends on their regulatory focus. Consistent with the previous literature (e.g., Lewin, 1935; Miller, 1944), there was evidence that motivation increases as one moves closer to the goal: the goal looms larger effect. The results of our studies deepen the understanding of this effect by considering the strategic nature of this motivation and the role of regulatory focus in moderating its strategic nature. All of our studies showed that approach strategic motivation increased more when participants worked to attain the goal in a promotion focus than in a prevention focus. Most notable, all of our studies indicated

Table 14
Summary of Simultaneous Regression Analysis for Ideal and Ought Strength Predicting the Difference Between Steepness of the Approach Versus Avoidance Gradients

Variable	B	$SE\ B$	β	t	p
Ideal strength	0.041	0.018	.353	2.28	0.025
Ought strength	−0.048	0.014	−.553	−3.58	0.0006

Note. Higher ideal strength reflects higher accessibility of ideal self-guide; similarly, higher ought strength reflects higher accessibility of ought self-guide.

Table 15
Summary of Simultaneous Regression Analysis for Ideal Strength, Ought Strength, and Other Variables Predicting Difference Between Steepness of the Approach Versus Avoidance Gradients

Variable	*B*	*SE B*	*β*	*t*	*p*
Ideal strength	0.042	0.018	.356	2.32	0.024
Ought strength	−0.043	0.014	−.485	−3.07	0.003
Expectancy	−0.0003	0.015	−.002	−0.02	0.985
Performance on green anagrams	−0.0006	0.013	.007	0.05	0.961
Performance on red anagrams	0.024	0.015	.219	1.63	0.108

Note. Higher ideal strength reflects higher accessibility of ideal self-guide; similarly, higher ought strength reflects higher accessibility of ought self-guide. Higher expectancy scores reflect higher success likelihood ratings and higher performance scores reflect higher number of solutions for green and red anagrams.

that avoidance strategic motivation increased more when participants worked to attain the goal in a prevention focus than in a promotion focus. These results were attained for both an intensity measure and a persistence measure of motivational strength as well as when regulatory focus was a personality variable or was experimentally induced.

These results suggest that the classic finding of increasing the strength of approach motivation as participants work toward a goal is obtained when participants have a promotion focus, such as the animals in Brown's (1948) study that were approaching food and thus attaining promotion focus nourishment. Our results further suggest that this increasing strength of approach motivation effect is not obtained for participants with a prevention focus. Our findings extend previous research on motivational strength during goal attainment by introducing the distinction between a promotion focus and a prevention focus while working toward a goal. Because regulatory focus theory considers strategic approach and avoidance motivation while working to attain a goal, it is possible to predict increasing strength of strategic approach motivation for participants in a promotion focus (i.e., increasing eagerness) and increasing strength of strategic avoidance motivation for participants working to attain a goal in a prevention focus (i.e., increasing vigilance).

It is also important to note that positive versus negative framing (i.e., promotion or prevention working versus promotion or prevention not working, respectively) did not influence the approach and avoidance gradients (Study 2), and neither did the expectancy of success versus failure (Study 3). In our model of the goal looms larger effect, differences in strategic means of goal attainment as a function of regulatory focus are independent of both outcome valence and outcome expectancy. These results highlight the importance of going beyond the hedonic principle to consider regulatory focus as an approach–avoidance strategic principle that has motivational significance in its own right (see Higgins, 1997).

In addition to its theoretical implications, understanding when approach and avoidance motivations are greater has potential practical significance. As just one example, consider campaigns for condom use to reduce the spread of AIDS. These campaigns have naturally framed the persuasive messages in terms of "safer sex" and the dangers to be avoided. Such messages involve a prevention focus. If the objective of these campaigns is to maximize the strength of avoidance motivation for using condoms (i.e., to avoid the danger of AIDS), then what is needed are prevention messages that would come to mind when the desired goal of having sex is near at hand and induce strategic avoidance responses. This strategy is unlikely to be successful, however, for individuals who are in a promotion focus at the critical moment of deciding about condom use, such as individuals who are feeling romantic, hopeful, or eager at the decisive moment. For these individuals, promotion focus messages are needed that would maximize the strength of strategic approach motivation for using condoms. For example, the campaign might emphasize promoting a caring relationship. What this AIDS campaign example highlights is that for the sake of practical objectives, as well as theory building, it might be useful for psychologists to consider regulatory focus as a distinct approach–avoidance principle that underlies motivational strength.

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