Promotion and Prevention Focus on Alternative Hypotheses: Implications for Attributional Functions

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Five studies examined hypothesis generation and discounting in causal attribution from the perspective of regulatory focus theory (E. T. Higgins, 1997, 1998). According to this theory, a promotion focus is associated with generating more and simultaneously endorsing multiple hypotheses, whereas a prevention focus is associated with generating only a few hypotheses and selecting 1 hypothesis from a given set. Five studies confirmed these predictions for both situationally induced and chronic individual differences in regulatory focus. In Studies 1, 2, and 3, individuals in a promotion focus generated more hypotheses than individuals in a prevention focus. In Studies 4 and 5, individuals in a promotion focus discounted explanations in light of alternatives less than individuals in a prevention focus. Study 5 also found that in a promotion focus, person explanations were generalized across situations less than in a prevention focus.

The process of acquiring knowledge has often been described as consisting of generating hypotheses, testing their validity, and then using them to predict future outcomes (Heider, 1958; Jones & Davis, 1965). In this process, people often need to deal with more than one hypothesis: They may generate multiple hypotheses or evaluate a preexisting set of multiple hypotheses (Kruglanski, 1990; Trope & Liberman, 1996). For example, in trying to make sense of the behavior of others, people might generate or try to evaluate hypotheses about their traits and dispositions (e.g., Is Jonathan an introvert?), the social situations in which they operate (e.g., Was the party too loud?), and the physical reality (e.g., Was it too hot in the room?). When generating hypotheses, one may choose to generate many hypotheses or confine oneself to only a few. When evaluating a set of plausible hypotheses, one might feel a need to choose between the alternatives or simultaneously endorse a number of alternative explanations. Furthermore, one may or may not choose to generalize a given causal explanation to other situations and may or may not use it for predicting future outcomes.

In this article, we propose a motivational perspective on how people deal with multiple hypotheses. Specifically, we propose that hypothesis generation and hypothesis evaluation serve general hedonic goals and that, as such, they are subject to the same principles that govern goal-directed activities (cf. Friedrich, 1993; Kruglanski, 1990; Kunda, 1990; Trope & Liberman, 1996). We use regulatory focus theory as a theoretical framework to derive predictions about when different strategies of hypothesis generation will be used. We then consider the implications of these strategies for evaluation of simultaneously present multiple hypotheses as well as for the use of such hypotheses when one is drawing inferences about future outcomes. For this purpose, we start with a brief outline of regulatory focus theory.

Regulatory focus theory proposes that beyond the general hedonic notion that people approach pleasure and avoid pain, different ways of approaching pleasure (as well as avoiding pain) should be recognized (Higgins, 1997, 1998). The theory concentrates on self-regulation toward 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; Gollwitzer & Bargh, 1996; Miller, Galanter, & Pribram, 1960; Pervin, 1989; Von Bertalanffy, 1968; cf. Elliot & Church, 1997; Elliot & Harackiewicz, 1996). The theory proposes the existence of distinct regulatory systems that are concerned with acquiring either nurturance or security as desired end-states. Individuals’ self-regulation in relation to their hopes and aspirations (ideals) satisfies nurturance needs. The goal is accomplishment, and the regulatory focus is promotion. Individuals’ self-regulation in relation to their duties and obligations (oughts) satisfies security needs. The goal is safety, and the regulatory focus is prevention (see Higgins, 1997, 1998, for a more detailed presentation of the theory).

Individuals can differ in their chronic promotion focus on hopes, aspirations, and accomplishments versus their chronic prevention focus on duties, obligations, and safety. Differences in chronic regulatory focus can arise from differences in the quality of parental involvement (see Higgins & Silberman, 1998). A parenting
history of protection and use of punishment as discipline produces strong oughts representing duties and obligations and prevention concerns with safety and security. In contrast, parenting that is characterized by encouraging accomplishments and withdrawing love as discipline produces strong ideals representing hopes and aspirations and promotion concerns with accomplishments and advancements (see Higgins & Slieberman, 1998). In addition to varying chronically across individuals, regulatory focus can be induced temporarily in momentary situations. For example, task instructions can be framed to communicate either gain/non-gain (promotion focus) or non-loss/loss (prevention focus) information. Another example is that thoughts about hopes and aspirations (ideals) can induce or prime a promotion focus, whereas thoughts about duties and responsibilities (oughts) can induce a prevention focus.

Regulatory focus theory proposes that promotion focus and prevention focus differ in their strategic inclinations for attaining desired end-states. Because a promotion focus involves a sensitivity to positive outcomes (their presence and absence), an inclination to approach matches to desired end-states is the natural strategy for promotion self-regulation (e.g., pursue all means of advancement). In contrast, because a prevention focus involves a sensitivity to negative outcomes (their absence and presence), an inclination to avoid mismatches to desired end-states is the natural strategy for prevention self-regulation (e.g., carefully avoid any mistakes). Higgins, Roney, Crowe, and Hymes (1994), for example, found that participants primed with promotion focus ideals better recalled episodes exemplifying approaching a match to a desired end-state (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 this morning”) than those exemplifying avoiding a mismatch to a desired end-state (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 reverse was true for participants primed with prevention focus oughts (cf. Higgins & Tykocinski, 1992).

Of most relevance for the present framework, these distinctions of regulatory focus theory can be applied to a signal-detection situation, such as deciding whether a stimulus was present or not or deciding whether a hypothesis should be adopted or not (Tanner & Swets, 1954; Trope & Liberman, 1996). There are four different outcomes for a signal-detection trial: (a) a hit—accepting a correct stimulus or deciding to adopt a right hypothesis, (b) a miss—rejecting a correct stimulus or deciding not to adopt a right hypothesis, (c) a false alarm—accepting a false stimulus or deciding to adopt a wrong hypothesis, and (d) a correct rejection—rejecting a false stimulus or deciding not to adopt a wrong hypothesis. A promotion focus, because it strategically involves approaching matches to a desired end-state, should relate to eagerness to ensure hits and ensure against errors of omission or misses (i.e., a loss of an opportunity for accomplishment). In contrast, a prevention focus, because it strategically involves avoiding mismatches to a desired end-state, should relate to vigilance to ensure correct rejections and ensure against errors of commission or false alarms (i.e., making a mistake).

Crowe and Higgins (1997) provided evidence for these predictions in a study on recognition memory. Participants were situationally induced with either a promotion focus or a prevention focus. Specifically, they were told that depending on their performance on a memory task, they would have an opportunity for performing a liked task (promotion focus) or of not performing a disliked task (prevention focus). Performance on the recognition memory task was then examined. In this task, participants first memorized a series of nonsense syllables and then were presented with the same syllables among distractors that had not appeared in the original list. For each test syllable, they had to indicate whether it had appeared in the original list. As predicted, participants in a promotion focus had a risky bias of saying yes (i.e., a relatively large number of hits and false alarms), whereas participants in a prevention focus had a conservative bias of saying no (i.e., a relatively large number of correct rejections and omissions).

How does the logic of regulatory focus apply to the situation of considering multiple hypotheses? The application to hypothesis generation is straightforward. If one generates facilitatory causes that are each sufficient to produce the effect, and as long as one does not have to ultimately select a subset of these hypotheses, then generating more hypotheses increases the likelihood of finding a correct hypothesis (i.e., more hits) and decreases the likelihood of leaving out a correct hypothesis (i.e., fewer misses). At the same time, generating more hypotheses increases the likelihood of including a wrong hypothesis (i.e., more false alarms) and decreases the likelihood of rejecting a wrong hypothesis (i.e., fewer correct rejections). Thus, from the perspective of regulatory focus theory, individuals in a promotion focus should generate more hypotheses than individuals in a prevention focus.

Sometimes people do not generate hypotheses on their own but instead are asked to consider a set of preexisting hypotheses. For example, in classic studies on causal attribution, participants evaluated simultaneously presented person, situation, and entity explanations for a target’s behavior (e.g., McArthur, 1972). Although different processes might underlie generating hypotheses and evaluating a given set of hypotheses (Koehler, 1994), regulatory focus theory predicts that in both cases a promotion focus would be associated with simultaneously endorsing multiple hypotheses, whereas a prevention focus would be associated with selecting a smaller subset of hypotheses. When one is given a number of plausible, uncorrelated alternative causes, each of which is sufficient but not necessary to produce the effect (e.g., a person and a situation explanation for a behavior), endorsing a number of explanations simultaneously increases both the likelihood of having a correct explanation (a hit) and the likelihood of having a wrong explanation (a false alarm). Choosing between the alternative explanations, in contrast, decreases the likelihood of both hits and false alarms. It follows, then, that individuals in a promotion focus would be more inclined to simultaneously endorse more than one alternative hypothesis, whereas individuals in a prevention focus would try to decide between the alternative explanations.

In the context of causal attribution, this logic of regulatory focus theory implies that, in the conditions specified above, individuals in a promotion focus are less likely than individuals in a prevention focus to engage in causal discounting. Causal discounting was postulated in classic attribution theories (Heider, 1958; Jones & Davis, 1965; Kelley, 1973) as a central principle of dealing with multiple hypotheses. It is derived from a subtractive logic and refers to the notion that introducing an alternative cause for a behavior should decrease confidence in the original cause. More generally, discounting means that when one is considering multiple causes for a certain behavior, the degree of belief in one cause should be inversely related to the degree of belief in another cause (i.e., the ratings of the plausibility of alternative causes should be
negatively correlated). More recent theories have uncovered a number of moderators of discounting, suggesting that discounting is reduced (and should be reduced according to normative bayesian rules) the higher is the prior probability of the to-be-discounted cause, the higher is the correlation between causes, the less sufficient is the to-be-discounted cause, and the more one believes in the existence of other causes (McClore, 1998; Morris & Larrick, 1995). In addition, conversationally relevant causes and causes that constitute abnormal conditions are perceived as better explanations than irrelevant causes and normal conditions. Consequently, relevant and abnormal causes should not necessarily be discounted if alternative irrelevant or normal causes are presented (Cheng & Novick, 1991; Hilton & Erb, 1996).

We now examine more closely the logic of causal discounting. Consider the simplest case in which there are two plausible alternative causal explanations for a behavior, each of the two explanations is sufficient to produce the effect, together they cover the entire range of possible causes, and they are not correlated with each other and do not logically follow from each other. All of the theories mentioned above would predict discounting in this case. From the perspective of promotion and prevention focus, however, a different picture emerges. If a person slightly favors one explanation over the other, then rejecting the less preferred hypothesis rather than retaining both hypotheses decreases the probability of a false alarm while increasing to a smaller degree the probability of a miss. If both errors are equally costly, one should reject the less preferred hypothesis rather than retaining both hypotheses. If misses are more costly than false alarms, however, as we believe is the case in a promotion focus, rejecting the less preferred hypothesis is not necessarily the best strategy. As long as ensuring against an error of omission (i.e., a miss) balances the failure to reject the less preferred hypothesis, retaining both hypotheses is normative in a promotion focus. Thus, discounting is normative when false alarms are at least as costly as misses, as is the case in a prevention focus, but not when misses are more costly than false alarms, as is the case in a promotion focus. We should emphasize that this analysis predicts that individuals in a promotion focus are less likely to discount alternative hypotheses when the alternatives are perceived as relatively close in plausibility—not when one explanation is strongly preferred over the other.

Regulatory focus theory introduces an additional motivational moderator of discounting. This motivational moderator does not relate to people's beliefs about the potential causes of an act (i.e., their necessity, sufficiency, prior probability, correlation, abnormality, or conversational relevance) but rather relates to the way in which people make decisions based on those beliefs. Previous theories of discounting assumed only two possible outcomes: being right and being wrong. Dropping the least likely hypothesis whenever a more likely alternative is present increases one's chances of being right and decreases the chances of being wrong, and thus should be normatively predicted from this binary right-wrong perspective. We propose, in contrast, that there are two ways of being right (hits and correct rejections) and two ways of being wrong (misses and false alarms) and that people are differentially sensitive to these outcomes. Our theory is motivational because it suggests that people's needs and concerns (regulatory focus) affect the weights that they assign to different types of errors, thereby also affecting discounting (cf. Friedrich, 1993; Trope & Liberman, 1996).

Our analysis also has implications for the use of causal explanations in subsequent predictions. According to classic attribution theories (Heider, 1958; Kelley, 1973), people engage in causal inferences about behavior so as to predict important outcomes in the social environment. People try to decide between a dispositional and a situational explanation of a target's behavior because dispositional attributions enable one to predict how the target will behave in future situations. Our analysis questions the generality of this attributional function. When individuals in a prevention focus engage in discounting, their level of confidence in the remaining alternative reflects a belief not only in its sufficiency to produce the effect but also in its necessity (see also Zuckerman et al., 1988, for a discussion of the relation between discounting and necessity beliefs). Thus, individuals in a prevention focus are more likely than individuals in a promotion focus to translate their ratings of the high plausibility of a cause into an assertion about its existence and to use it to predict outcomes in other situations. In other words, individuals in a prevention focus are more likely to generalize their causal inferences across situations than are individuals in a promotion focus, who would not have a high level of confidence in any single cause.

The following studies tested these predictions of regulatory focus theory. Studies 1–3 tested the prediction that individuals in a promotion focus would generate more hypotheses than individuals in a prevention focus. Studies 4 and 5 tested the predictions that individuals in a promotion focus would discount explanations in light of alternative explanations less than individuals in a prevention focus. Study 5 also tested the prediction that individuals in a promotion focus would use their explanations of social behavior to predict behavior in other situations less than individuals in a prevention focus. In our studies, the difference in promotion versus prevention focus was both a chronic personality variable (Studies 1, 3, and 4) and an experimentally manipulated situational variable (Studies 2 and 5).

Study 1: Hypothesis Generation for Individuals Varying in Strength of Regulatory Focus

In this study, we examined how chronic individual differences in regulatory focus affect the number of generated hypotheses. Participants had to guess what object was depicted in each of four ambiguous photographs (see Maysels & Kruglanski, 1997, for a similar procedure). Participants could generate as many hypotheses as they wanted for each picture. As we mentioned earlier, regulatory focus theory proposes that individuals differ in their chronic promotion focus on hopes, aspirations, and accomplishments versus their chronic prevention focus on duties, obligations, and safety. Inspired by Fazio's research on attitude strength as measured by attitude accessibility (see Fazio, 1986, 1995), Higgins, Shah, and Friedman (1997) measured individual differences in promotion focus strength and prevention focus strength by reaction times to questions about ideal and ought self-guides. Fazio (1986, 1990) used reaction time to measure attitude accessibility, assuming that the latency required to produce a given attitude is a reflection of its accessibility. This operationalization reasonably assumes that accessibility is activation potential and that stored knowledge with higher activation potentials should produce faster responses to relevant inputs (see Higgins, 1996). Fazio (1986, 1995) empirically demonstrated the predictive usefulness of this operationalization, and Bassili (1995, 1996) provided compelling
evidence that the use of reaction times as an implicit measure of attitude predisposition strength is preferable to explicit measures such as ratings of importance (see also Greenwald & Banaji, 1995).

Higgins et al. (1997) then considered response latencies for the recall of a self-guide to be a measure of the accessibility and strength of the self-guide. Chronically accessible ideal self-guides reflect a stronger promotion focus, and chronically accessible ought self-guides reflect a stronger prevention focus. Studies on emotions, motivation, performance, and decision making have found strong support for these proposals (see Förster, Higgins, & Idson, 1998; Higgins et al., 1997; Liberman, Idson, Camacho, & Higgins, 1999; Shah & Higgins, 1997; Shah, Higgins, & Friedman, 1998). In the present study, we predicted that the number of generated hypotheses would increase as strength of promotion focus increased and would decrease as strength of prevention focus increased.

Method

Participants. One hundred undergraduate students (53 men and 47 women) at Columbia University were paid for their participation in a battery study. All participants indicated that English was their native language. There were no differences between male and female participants in any of the results reported below.

Procedure. In the first session of the study, participants completed the Strength of Self-Guide measure. Like the Selves Questionnaire (see Higgins, Klein, & Strauman, 1985), the Strength of Self-guide measure is an idiographic measure that asks participants to list attributes describing certain self-representations from their own standpoint (see Higgins et al., 1997). Participants were initially provided with a definition of their ideal self and their ought self. Their ideal self was defined as the type of person they ideally would like to be, the type of person they hoped, wished, or aspired to be. Their ought self was defined as the type of person they believed they ought to be, the type of person they believed it was their duty, obligation, or responsibility to be. They were told that they would be asked to provide attributes that described their ideal and ought selves. The attributes describing the ideal self had to be different from those describing the ought self (unlike the Selves Questionnaire), and all attributes were to be provided as quickly and accurately as possible.

Participants were then asked to list the attributes in a seemingly random order: one ideal attribute, followed by two ought attributes, another ideal attribute, another ought attribute, and a final ideal attribute. After listing each of the ideal attributes, participants were asked to rate the extent to which they ideally would like to possess the attribute (ideal extent) and the extent to which they actually possessed the attribute (actual ideal extent) on a 4-point scale ranging from 1 to 4 (1 = slightly, 2 = moderately, 3 = a great deal, and 4 = extremely). In a similar manner, after listing each of the ought attributes, they were asked to rate the extent to which they ought to possess the attribute (ought extent) and the extent to which they actually possessed the attribute (actual ought extent) on the same 4-point scale.

The computer also recorded the amount of time each participant took to produce each attribute and to make the corresponding extent determinations. All reaction time measures were first transformed using a natural logarithmic transformation because the reaction time distributions were positively skewed (see Fazio, 1990; Judd & McClelland, 1989). Then, a total ideal strength assessment and a total ought strength assessment were calculated by separately summing attribute reaction times and extent reaction times (e.g., ideal extent and actual ideal extent) across the first three ideal attributes and across the first three ought attributes. Slower (i.e., higher) response times for queries about one’s ideals indicate weaker ideal self-guides, and slower response times for queries about one’s oughts indicate weaker ought self-guides. The response time measure was reverse scored (multiplied by -1) so that higher scores reflect faster response time and stronger self-guides. Both scores are based on response time and thus are positively correlated. Therefore, they can be used meaningfully only when the common variance is eliminated (e.g., in a simultaneous regression analysis or as a difference score).

In the second session of the study, which was held 7–9 weeks after the first session, participants were introduced to the object naming task. They received a booklet containing four pictures, with each picture on a separate page. The pictures were of familiar objects but were taken from unusual angles and were difficult to recognize. Participants were instructed to try to guess what the object in each picture was (see Mayeless & Kruglanski, 1987, for a similar procedure). Specifically, the following instructions appeared on the computer screen:

In this task you will be presented with pictures of familiar objects. The pictures were taken from unfamiliar angles, so that the objects are difficult to recognize. Your task will be to guess what the object in the picture is. You may list as many or as few answers as you want.

No time constraints were introduced, and participants typed their responses into the computer. All of the hypotheses for one picture were typed on the same computer screen, and participants pressed the “return” key and proceeded to a new screen for the next picture. The computer recorded the time that participants took to generate all of the hypotheses for each picture.

Results and Discussion

On average, participants in this study generated 6.70 hypotheses for all four pictures and spent 3.18 min on the task. The main dependent measure was the total number of hypotheses each participant generated. We regressed this number on ideal and ought strength in a simultaneous regression analysis. Consistent with our predictions, as ideal strength increased (controlling for ought strength), more hypotheses were generated (β = 0.25, p < .05). In contrast, as ought strength increased (controlling for ideal strength), fewer hypotheses were generated (β = −0.20, p = .10).

Thus, as we predicted, two independent effects were obtained: Ideal strength increased the number of generated hypotheses, and ought strength decreased the number of generated hypotheses (the latter effect being of borderline significance). To illustrate this result, we classified participants as predominantly having a promotion focus or predominantly having a prevention focus on the basis of a median split of the difference between their ideal strength and their ought strength. The predominantly promotion-focused participants generated 7.04 hypotheses for all four pictures, whereas the predominantly prevention-focused participants generated 6.36 hypotheses for all four pictures.

We also examined the overall amount of time that participants spent on the task and the time it took them to produce each hypothesis. A simultaneous regression analysis on the total time spent on the task revealed no effect for either ideal strength or ought strength (both ns < 1). However, a regression analysis on the time it took to generate each hypothesis revealed that ideal strength (controlling for ought strength) was related to faster generation of hypotheses, B = −0.04, t(97) = −2.65, p < .01, whereas ought strength (controlling for ideal strength) showed an insignificant tendency in the reverse direction, B = 0.02, t(97) = 1.34, p = .18. To illustrate this result, we classified participants as predominantly promotion-focused or predominantly prevention-focused on the basis of a median split of the difference between their ideal strength and their ought strength. The predominantly promotion-focused participants took 26.4 s, on average, to generate each
hypothesis, whereas the predominantly prevention-focused participants took 32.4 s, on average, to generate each hypothesis. Thus, ideal strength increased the number of generated hypotheses by increasing the speed of generating each hypothesis rather than by increasing the amount of time spent on the task.

Study 2: Hypothesis Generation in Promotion Framing or Prevention Framing

The next study examined how framing the same activity in promotion versus prevention terms affects the number of generated hypotheses. Participants performed the same task as that used in Study 1, with the only difference being that a framing manipulation of regulatory focus and outcome valence was introduced. Specifically, participants in the two promotion focus conditions were told either that they would gain a point for each picture as long as one of their responses was the correct answer (promotion success) or that they would not gain a point if none of their responses was the correct answer (promotion failure). Participants in the two prevention focus conditions were told either that they would not lose a point for each picture as long as one of their responses was not wrong (prevention success) or that they would lose a point if all of their responses were wrong (prevention failure). In addition, by succeeding on the task overall, promotion focus participants were told that they would gain a dollar, and prevention focus participants were told that they would not lose a dollar. The criterion of success on the task was the same for everyone, and the payoff was also the same for everyone (i.e., $6 for success and $5 for failure). On the basis of the logic of regulatory focus theory, we predicted that participants in the promotion framing condition would generate more hypotheses than participants in the prevention framing condition. We predicted no differences between positive (success) and negative (failure) framings.

Method

Participants. Sixty undergraduate students (32 men and 28 women) at Columbia University were paid participants in the study. There were no differences between male and female participants in any of the results reported below.

Procedure. Participants performed the same object naming task as that used in Study 1, but they received additional framing instructions. They were randomly assigned to one of four framing conditions: promotion success, promotion failure, prevention success, or prevention failure. All participants received the following instructions on the computer:

In this task you will be presented with pictures of familiar objects. The pictures were taken from unfamiliar angles, so that the objects are difficult to recognize. Your task will be to guess what the object in the picture is. In order to motivate you, we have decided to make your payment for the experiment dependent on your performance in this task.

Participants in the promotion success condition were then told,

That is, although your payment has been set at $5, you can gain a dollar. In this task, you start with zero points and you can gain up to four points. You will have a total of four pictures to identify. You may suggest a number of alternative answers for each picture. For each picture, as long as your response contains the right answer, you gain a point. At the end of the experiment we will compute your score. If your score is higher than the average score for Columbia students who participated in the experiment in the past, you will gain a dollar.

In the promotion failure condition, the italicized phrase in the preceding instructions was replaced with "if your response does not contain the right answer, you do not gain a point." Participants in the prevention success condition were told,

That is, although your payment has been set at $6, you can lose a dollar. In this task, you start with four points and you can lose up to four points. You will have a total of four pictures to identify. You may suggest a number of alternative answers for each picture. For each picture, as long as your response does not contain only wrong answers, you don't lose a point. At the end of the experiment we will compute your score. If your score is higher than the average score for Columbia students who participated in the experiment in the past, you will not lose a dollar.

In the prevention failure condition, the italicized phrase in the preceding instructions was replaced with "if your response contains only wrong answers, then you lose a point." At the end of the experiment, all participants were fully debriefed and thanked for their participation.

Results and Discussion

On average, participants generated 9.05 hypotheses (vs. 6.70 in Study 1) and spent 3.55 min on the task (vs. 3.18 min in Study 1). Thus, overall, participants in this study generated more hypotheses and spent more time on the task than did participants in Study 1. This finding could be due to the framing with its financial incentives increasing the overall level of motivation relative to Study 1 (see Liberman et al., 1999, for a similar effect of this kind of framing manipulation).

The number of hypotheses that each participant generated was the main dependent measure in our study. The number of generated hypotheses was averaged across the four pictures and entered into a 2 (regulatory focus: promotion vs. prevention) × 2 (outcome valence: success vs. failure) between-subjects analysis of variance (ANOVA). This analysis yielded a significant main effect for regulatory focus, F(1, 56) = 4.14, p < .05, but no main effect for outcome valence and no interaction (both Fs < 1). These results indicated that, as we predicted, participants in a promotion focus generated more hypotheses (M = 10.28) than participants in a prevention focus (M = 7.90; see Table 1).

The overall time it took participants to complete the task was also entered into a 2 (regulatory focus: promotion vs. prevention) × 2 (outcome valence: success vs. failure) between-subjects ANOVA, which revealed no significant main effects and no interaction (all Fs < 1). Thus, consistent with Study 1, participants in a promotion focus spent the same total amount of time on the task as participants in a prevention focus but nevertheless generated more hypotheses. This finding suggests that participants in a promotion focus were faster to generate each hypothesis. We computed the time it took participants to generate each hypothesis

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<td>Promotion</td>
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by dividing the total time by the number of hypotheses generated. A 2 (regulatory focus: promotion vs. prevention) × 2 (outcome valence: success vs. failure) between-subjects ANOVA on this score revealed a main effect for regulatory focus, F(1, 56) = 6.34, p < .02, indicating that participants in a promotion focus were faster to generate each hypothesis (M = 22.2 s per hypothesis) than participants in a prevention focus (M = 28.8 s per hypothesis). There was no effect for outcome valence and no interaction (both Fs < 1). In sum, consistent with Study 1, participants in the promotion focus generated more hypotheses and were faster in generating each hypothesis than participants in a prevention focus.

Study 3: Life Event Explanations From Individuals Varying in Strength of Regulatory Focus

This study examined how the number of explanations given for autobiographical life events relates to chronic differences in promotion and prevention focus. Specifically, participants recalled instances of two interpersonal behaviors, helping someone and criticizing someone, and then explained why they had behaved in that particular way. We predicted that the number of generated explanations would increase as strength of promotion focus increased and would decrease as strength of prevention focus increased.

Method

Participants. Twenty-nine undergraduate students (12 men and 17 women) at Columbia University were paid participants in the study. There were no differences between male and female participants in any of the results reported below. All participants indicated that English was their native language.

Procedure. Participants first completed the Strength of Self-Guide measure described in Study 1. They then completed a short unrelated study on decision making. Next, participants were introduced to an experiment on “memory for social events” and were told that they would have to remember two different events and answer a few questions about each of them. The instructions were “Think of an occasion when you helped somebody. Please describe this event in brief outline (not more than three lines).” Three blank lines followed, after which the following instructions appeared on the same page: “Please indicate the possible causes of this behavior, i.e., please describe why you behaved the way you did. You may indicate as many (or as few) causes as you like.” Thus, participants were prompted to list sufficient facilitatory causes for their behavior. On the next pages, participants were asked how positive and how negative the event was that they recollected, how important it was, how emotional it was, and how vivid their memory of the event was. These questions were followed by scales ranging from 1 (not at all) to 9 (very much). In addition, participants were asked when the event they recollected had happened. These questions were designed to assess possible content differences between events recollected by individuals varying in strength of regulatory focus.

After completing these questions for an instance of helping someone, participants repeated the same questions for criticizing someone. Half of the participants first answered questions about an instance of helping and then answered questions about an instance of criticizing, whereas for the other half of the participants, the order was reversed. Order had no effects on any of the results reported below.

Results and Discussion

Two independent coders, naive to participants’ regulatory focus and to the experimental hypothesis, counted the number of explanations each participant generated for each of his or her behaviors. The correlations between the counts provided by the two judges were high—r(27) = .90 and r(27) = .97 for helping and criticizing, respectively—and discrepancies were resolved through discussion. We regressed the number of explanations on ideal and ought strength in a simultaneous regression analysis, separately for each type of behavior (i.e., helping and criticizing). Consistent with our predictions, as ideal strength increased (controlling for ought strength), more explanations were generated for helping (B = 0.32, p < .05). In contrast, as ought strength increased (controlling for ideal strength), fewer explanations were generated for helping (B = -0.45, p < .01). The results for criticizing revealed the same pattern. As ideal strength increased (controlling for ought strength), more explanations were generated for criticizing someone (B = 0.31, p < .05). In contrast, as ought strength increased (controlling for ideal strength), fewer explanations were generated for criticizing someone (B = -0.32, p < .05).

Thus, as we predicted, two independent effects were obtained: Ideal strength increased the number of generated explanations, and ought strength decreased the number of generated explanations. Moreover, this effect was obtained for both types of behavior examined in our study—helping and criticizing. To illustrate this result, we classified participants as predominantly promotion-focused or predominantly prevention-focused on the basis of a median split of the difference between their ideal strength and their ought strength. The predominantly promotion-focused participants generated an average of 4.29 explanations for helping and 3.86 explanations for criticizing. In comparison, predominantly prevention-focused participants generated an average of 2.93 explanations for helping and 2.87 explanations for criticizing.

We examined the possibility of some systematic content differences between the memories of promotion-focused and prevention-focused individuals. For this purpose, we regressed people’s ratings of valence, importance, emotionality, and vividness of the recollected events, as well as the estimates of when they occurred, on ideal and ought strength in a simultaneous regression analysis. This analysis revealed no relation of any of these ratings to either ideal strength or ought strength (all r’s < 1). Thus, it appears unlikely that any such systematic difference existed, at least for the dimensions examined.

In sum, this study showed that participants in a promotion focus generated more explanations for their own behavior than participants in a prevention focus. Thus, it provides an extension of the findings of Studies 1 and 2 to the domain of explanations for autobiographical life events. Together, Studies 1–3 provide convergent evidence in support of our hypothesis that individuals in a promotion focus would generate more hypotheses than individuals in a prevention focus. This pattern was found for both chronic inclinations toward promotion and prevention focus (Studies 1 and 3) and situationally induced promotion and prevention focus (Study 2). Moreover, this pattern was found with both experimentally constructed materials having to do with identifying ambiguous pictures (Studies 1 and 2) and contents of everyday life having to do with past autobiographical memories for interpersonal behaviors (Study 3). We interpret these results in terms of the tendency of individuals in a promotion focus to adopt a more risky strategy, one in which hits are valued more than correct rejections, and false alarms are less costly than misses. Someone with this strategy would want to generate as many hypoth-
esises as possible, hoping in this way not to miss the right hypothesis. In contrast, a conservative strategy of ensuring against an error of commission, which is characteristic of a prevention focus, would be concerned with not producing a wrong hypothesis and, therefore, would be careful to generate relatively few alternative hypotheses.  

Generating hypotheses is a cognitive activity, and its extent should depend, therefore, on both availability of cognitive resources and motivation to engage in such activity. Consistent with this view, lay epistemic motivation theory (Kruglanski & Webster, 1996) conceptualized generating multiple hypotheses as moving away from cognitive closure. It was shown that high need for closure, operationalized as a belief that clear-cut opinions relate to one’s intelligence, was associated with generating few hypotheses and high need to avoid closure, operationalized as a belief that correct visual recognition relates to intelligence, fostered generation of multiple hypotheses (Mayseless & Kruglanski, 1987). Following this logic, other variables that induce a high need for closure, such as time pressure, should decrease the number of hypotheses that people generate, and variables that induce a high need to avoid closure, such as a need for accuracy, should increase hypothesis generation. It is important to note in this regard that our results were obtained under circumstances that were neutral with respect to need for closure or that were the same in all conditions. In all three studies, for example, there were no time constraints on the task, and the manipulation of regulatory focus in Study 2 included a higher payoff when participants were accurate in every condition. In addition, numerous studies found strength of self-guides to be uncorrelated with need for closure (see Study 4 presented below as well as Molden & Higgins, 2000).

Regulatory focus effects on the number of generated hypotheses can, therefore, occur independently of need for closure. Whereas overall amount of motivation can be conceptualized in terms of the overall value of being right or being wrong, promotion focus versus prevention focus involves two distinct types of both positive value (i.e., hits vs. correct rejections, respectively) and negative value (i.e., misses vs. false alarms, respectively). To provide more direct evidence for this independence, in the next study we examined regulatory focus effects while controlling for participants’ chronic need for closure.

Our studies thus far have shown that when generating hypotheses, including explanations, individuals in a promotion focus tend to simultaneously consider more alternatives than individuals in a prevention focus. In the next two studies, we examined whether the same result is obtained when people are presented with a pregenerated set of hypotheses. We predicted that in this situation as well, participants in a promotion focus would be more likely than participants in a prevention focus to simultaneously endorse more than one hypothesis. The next two studies tested this prediction both by measuring chronic differences in regulatory focus (Study 4) and by situationally inducing regulatory focus (Study 5). Study 5 also tested the additional prediction discussed earlier that, as a result of not discounting alternative explanations, people in a promotion focus are less committed to a cause they rate as highly plausible than people in a prevention focus, and thus are less likely to use causal inferences to predict outcomes in other situations.

Study 4: Causal Discounting for Individuals Varying in Strength of Regulatory Focus

This study examined how people’s use of the subtractive logic in causal explanation (i.e., discounting) relates to chronic differences in promotion and prevention focus. Specifically, participants read a scenario describing a helpful action performed by Bill and rated the extent to which a situational and a dispositional cause explained his behavior. The scenario had been pretested to equally favor both types of explanations. We predicted that the use of the discounting logic would decrease as strength of promotion focus increased and would increase as strength of prevention focus increased. Specifically, we predicted that the ratings of the person and situation explanations would be less negatively correlated and closer to each other as strength of promotion focus increased and would be more negatively correlated and further away from each other as strength of prevention focus increased.

Method

Participants. Fifty-one undergraduate students (28 men and 23 women) at Columbia University were paid for their participation in a two-session experiment. All participants indicated that English was their native language. There were no sex differences in any of the results reported below.

Materials. We pretested a few scenarios to find one in which different explanations for the actions of the protagonist would be rated as highly plausible and relatively close to each other. Meeting this requirement was important to us because we wanted to examine discounting free of content effects. Specifically, we wanted discounting to be equally likely to enhance confidence in a specific cause (at the cost of reducing confidence in another cause) as to reduce confidence in it (at the cost of enhancing confidence in another cause). We wanted to avoid a situation in which the use of the discounting principle would be equivalent to preferring a content-specific explanation (e.g., a person explanation) over another content-specific explanation (e.g., a situation explanation). The selected scenario was as follows:

Bill was helping a friend of his move into his new dorm at the beginning of the fall semester. He was a starting linebacker for the varsity football team, so people were always asking him for assistance when they had something heavy to move, and he usually agreed to lend a hand. They had rented a cart, and Bill was wheeling a load of his friend’s things into the lobby of the building when he saw a girl who was obviously struggling with a box that was too large for her to carry. He recognized her as someone he had seen in the gym regularly, and he asked her if she needed any help. She thanked him and Bill added her box to the load on the cart and wheeled it to her room for her.

Three questions followed this scenario, always in the same order: (a) “How much of Bill’s decision to help would you explain by the fact that Bill is a helpful type of person?” (the “person” explanation), (b) “How much of Bill’s decision to help would you explain by the fact that the girl was obviously having trouble?” (the “entity” explanation; see Kelley, 1973), and (c) “How much of Bill’s decision to help would you explain by the fact that Bill recognized the girl and had a cart with him?” (the “situation” explanation). Each of these questions was followed by a scale.

1 Notably, in our studies, participants did not have to select only one hypothesis after generating numerous alternatives. Potentially, if a single selection has to be made, continuing to generate more and more hypotheses can be distracting and decrease, rather than increase, one’s chances of a hit. Effective promotion, then, needs to enlist a “stop rule” in such cases.
ranging from 1 (not at all) to 7 (very much). It was emphasized that when making their ratings, participants should try to separately consider each explanation.

A pretest conducted with 41 undergraduate students from Columbia University revealed that each of the three explanations was rated as a good explanation for Bill’s behavior (Ms = 4.8 to 5.2). None of these explanations were rated as better than the others (F < 1). Our pretest also revealed a strong positive correlation between the person and entity explanations, r(39) = .52, p < .001, and no correlation between entity and situation, r = -.10, ns, or between person and situation, r = .07, ns. The high correlation between the person and entity explanations probably indicates a content association between these explanations, which is most likely due to the fact that in the scenario Bill knew the person whom he helped (see Kelley, 1973, for a discussion of the person–entity interaction as a possible causal inference). Our theory makes a clear prediction for only uncorrelated causes, and therefore we needed to concentrate on either the person or the entity explanation. We chose to consider the person explanation because it is more central in social psychology (Heider, 1958; Jones & Davis, 1965; Kelley, 1973).

Procedure. During the first session, the same Strength of Self-guide measure as that described in Study 1 was administered. After completing this measure on the computer, participants received booklets that contained the Need for Cognition Scale (Cacioppo & Petty, 1982) and the Need for Cognitive Closure Scale (Webster & Kruglanski, 1994). Participants returned to the second session 7–14 days after the first session. During the second session, they completed the causal attribution task described above, after which they were debriefed, paid, and thanked for their participation.

Results and Discussion

Consistent with the results of the pretest, both the person and situation explanations were rated as causing the behavior to a moderately strong degree (Ms = 5.52 and 5.55, respectively), and their ratings did not differ from each other (t < 1). Also consistent with the pretest, there was no correlation between the person and situation ratings (r = .08, ns). For the objectives of this study, it was important for us to establish that strength of self-guide was unrelated to favoring one explanation over the other. For that purpose, we coded giving higher ratings to the person explanation than to the situation explanation as 1, the reverse pattern as -1, and giving both explanations equal scores as 0. A simultaneous regression analysis of this score on ideal and ought strength did not reveal any significant effects. This result indicates that in both the promotion focus and the prevention focus, discounting (when it occurred) was not specific to any one content. That is, for both promotion focus and prevention focus, some people favored the person explanation (that may or may not be discounted), other people favored the situation explanation (that may or may be discounted), and other people favored neither explanation.

Our main hypothesis was that the causal explanations would be discounted less as ideal strength increased and would be discounted more as ought strength increased. Causal discounting is typically operationalized as the association between two explanations—the more negative the association, the more discounting takes place (e.g., McClure, Jaspars, & Lalljee, 1993; see McClure, 1998, for a review). Our prediction, then, was that both ideal strength and ought strength would moderate this correlation but in opposite directions. We expected the correlation to be less negative as ideal strength increased and more negative as ought strength increased.

To test this prediction, we conducted a simultaneous regression analysis, predicting the ratings of the person explanation from the ratings of the situation explanation, ideal strength, ought strength, and the interactions of ideal strength by the situation explanation and of ought strength by the situation explanation. A significant moderation would be revealed in the significance of the interaction terms (Baron & Kenny, 1986). The results of the regression, presented in Table 2, confirmed our prediction: Significant effects were found for the interactions of both ideal strength and ought strength with the situation explanation. As we predicted, the effects of these interaction terms were in opposite directions: As ideal strength increased, the situation explanation became more positively associated with the person explanation, B = 0.24, t(45) = 3.85, p < .005. Contrary to this prediction, as ought strength increased, the situation explanation became more negatively associated with the person explanation, B = -0.24, t(45) = -3.27, p < .005.

To illustrate our findings regarding the moderation of the discounting effect by regulatory focus, we classified participants as predominantly promotion-focused versus predominantly prevention-focused in the same way as before. Within each group, we regressed the ratings given to the person explanation on the ratings given to the situation explanation. Consistent with our hypothesis and with the discounting principle, we found a negative association for the predominantly prevention-focused individuals, B = -0.40, t(23) = -1.80, p = .08. Contrary to this negative relation, we found a positive association for the predominantly promotion-focused individuals, B = 0.54, t(24) = 4.20, p < .0005, indicating no evidence of discounting.

In our study, people rated two plausible explanations for Bill’s behavior. We reasoned that people in a prevention focus would try to decide between these explanations and thus would rate one of them much higher than the other. People in a promotion focus, in contrast, would not feel that they had to decide between the two explanations and thus would feel free to give similar scores to both explanations. To test this prediction, we computed for each participant the range of his or her ratings (i.e., we selected whichever was higher between the person and situation ratings and subtracted the other rating from it), and we regressed this range on ideal strength and ought strength in a simultaneous regression analysis. As we predicted, the range of scores decreased as ideal strength increased (controlling for ought strength), B = -0.20, t(48) = 2.80, p < .01, and increased as ought strength increased (controlling for ideal strength), B = 0.22, t(48) = 3.10, p < .005.

To illustrate this result, we divided participants into predominantly ideal and predominantly ought in the same way as before, and we computed for each participant his or her low and high ratings (see Table 3). We conducted a 2 (regulatory focus: predominantly ideal vs. predominantly ought) × 2 (type of rating: low

2 Another possibility was to index the person and entity explanations together. In Studies 4 and 5, using such an index yielded virtually the same results as those obtained with the person explanation only. We also should note that the causes that we used were identified in a previous pretest and were not designed a priori to reflect the categories of person, entity, and situation. The entity and situation labels, in particular, may appear questionable (but see Kelley, 1973). The labels, however, were of no central importance to our model and were used solely for convenience.

3 The regression also revealed significant main effects of ideal self-guide and ought self-guide. These main effects, however, are uninterpretable because they were obtained in a simultaneous regression in which higher order effects were entered (Cohen & Cohen, 1983).
vs. high) ANOVA, in which the first variable was between subjects and the second variable was within subjects. This analysis revealed the trivial effect of type of rating (obviously, the high ratings were higher than the low ratings), $F(1, 49) = 65.16, p < .0001$. It also revealed a Type of Rating × Regulatory Focus interaction, $F(1, 49) = 12.81, p < .001$, showing that, as we predicted, the difference between the high and low scores (i.e., the range) was higher for participants with a predominantly ought (prevention) focus than for participants with a predominantly ideal (promotion) focus. Interestingly, the low score was significantly lower for predominantly prevention-focused participants ($M = 4.48$) than for predominantly promotion-focused participants ($M = 5.46$), $F(1, 49) = 9.30, p < .005$, whereas the high scores did not significantly differ between the two groups ($Ms = 6.16$ and $6.12$, respectively; $F < 1$). Thus, regulatory focus did not affect the ratings given to the preferred explanation but did affect the ratings given to the rejected explanation, such that it received lower ratings by individuals in a prevention focus than individuals in a promotion focus.

In this study, we also examined whether our measures of discounting were related to need for cognition (Cacioppo & Petty, 1982) or need for cognitive closure (Webster & Kruglanski, 1994). Neither of these measures was related to regulatory focus. Both scales were regressed on ideal and ought strength, and no significant effects were found (all $r < 1$). In addition, neither need for closure nor need for cognition significantly moderated the correlation between the person and situation explanations, and neither of them significantly predicted the range of the ratings of these explanations. We also entered each of these measures into each of the regression analyses reported above. In every case, the effects involving ideal strength and ought strength remained unchanged and significant, indicating that these regulatory focus effects were independent of either need for cognition or need for cognitive closure.

Overall, the results of Study 4 confirmed our prediction that regulatory focus would influence people’s tendency to engage in causal discounting. As strength of chronic promotion focus increased, people had a less negative association between two competing explanations for a person’s behavior and rated the two competing explanations closer to each other. In contrast, as strength of chronic prevention focus increased, people had a more negative association between the two competing explanations and gave more divergent ratings to the two explanations. These effects were independent of need for cognitive closure and need for cognition. We believe that regulatory focus induces an asymmetry between two types of value or two types of error costs and thus is independent of overall motivation (see Trope & Liberman, 1996, for a similar distinction).

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>SE $B$</th>
<th>t(45)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.95</td>
<td>18.25</td>
<td>0.05</td>
<td>ns</td>
</tr>
<tr>
<td>Situation</td>
<td>0.52</td>
<td>3.07</td>
<td>0.17</td>
<td>ns</td>
</tr>
<tr>
<td>Ideal strength</td>
<td>-1.14</td>
<td>0.36</td>
<td>-3.18</td>
<td>.0027</td>
</tr>
<tr>
<td>Ought strength</td>
<td>1.10</td>
<td>0.42</td>
<td>2.60</td>
<td>.0126</td>
</tr>
<tr>
<td>Situation × Ideal Strength</td>
<td>0.24</td>
<td>0.06</td>
<td>3.85</td>
<td>.0004</td>
</tr>
<tr>
<td>Situation × Ought Strength</td>
<td>-0.24</td>
<td>0.07</td>
<td>-3.27</td>
<td>.0021</td>
</tr>
</tbody>
</table>

Table 3

<table>
<thead>
<tr>
<th>Predominant self-guide</th>
<th>Value</th>
<th>Promotion</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>6.12</td>
<td>6.16</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>5.46</td>
<td>4.48</td>
<td></td>
</tr>
</tbody>
</table>

Previous theories addressed moderators of discounting that have to do with people’s beliefs about the causes involved—their necessity, sufficiency, prior probability, intercorrelations (McClore, 1998; Morris & Larrick, 1995), relevance (Hilton & Erb, 1996), or abnormality (Cheng & Novick, 1991). Could it be that some of these previously identified moderators underlie the differences in discounting between promotion and prevention focus? To test for this possibility, we conducted an auxiliary study based on the same scenario as that used in Studies 4 and 5, in which prior probabilities, necessity, sufficiency, and beliefs in other causes, as well as promotion and prevention strength, were assessed. Promotion focus strength and prevention focus strength had no significant relation to any of these beliefs. We are not suggesting that regulatory focus never relates to the content of beliefs that can influence inferences (cf. Roece, Teakyn, & Pennington, 1999). Rather, these identified moderators do not account for the discounting findings of the present studies. Thus, regulatory focus theory introduces an additional moderator of discounting, one that does not relate to people’s beliefs about the causal structure of events but rather relates to the way in which they make decisions based on those beliefs (i.e., how they weigh different types of decision benefits and different types of decision costs).

Having established that people’s regulatory focus influences their tendency to discount causal explanations, the next question is how it affects the inferences that people draw from these explanations. As we discussed earlier, people who consider only a limited number of explanations and discount the alternatives are

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4 In the auxiliary study, 62 students from Columbia University were paid participants in a battery study. The population of this study was similar to those of Studies 4 and 5. Participants first completed the Strength of Self-Guide measure described in Study 1 and after 1 week returned for a second session, during which they were presented with the same scenario as that described in Study 4. They were asked to separately rate the necessity, necessity, and prior probability of the person, entity, and situation causes. The sufficiency question for the person cause was “Imagine a person witnessing the situation. How likely is it that a helpful personal disposition (i.e., being a helpful person) would be sufficient to cause one to offer help to the girl?” The necessity question for the person cause was “In the situation described, Bill ended up helping the girl. If Bill was not a helpful person, how likely is it that he would have helped the girl in this situation?” The prior probability question for the person cause was “Please estimate how often people in this type of situation encounter helpful people.” Each question was followed by a scale ranging from 1 (not at all likely or very rarely) to 9 (very likely or very often). Questions about the entity and situation causes were worded in a similar way. The order of the questions was counterbalanced across participants (there was no effect of order). Each of these measures was regressed on ideal strength and ought strength in a simultaneous regression analysis. None of the effects of ideal or ought strength reached statistical significance (in all regressions, $Fs < 1.65, ps > .20$).
likely to be more committed to the remaining explanation or explanations and use them more in subsequent inferences than people who maintain a greater number of possibilities and do not engage in discounting (Zuckerman et al., 1988). Study 5 was designed to test this prediction. In addition, it attempted to replicate the results of Study 4 by using a situational induction of promotion and prevention focus rather than measuring chronic differences in regulatory focus.

**Study 5: Causal Discounting and Behavioral Generalizations in Primed Promotion and Prevention Focus**

This study replicated and extended Study 4 by situationally priming promotion and prevention focus instead of measuring participants’ chronic regulatory focus. In addition, participants in this study rated the likelihood that the person described in our scenario would behave in a similar way in the future. We reasoned that because people in a promotion focus do not discount the importance of alternative explanations, they should show little correspondence between the strength of their person attribution and their willingness to generalize the behavior across situations. In contrast, because people in a prevention focus do discount the importance of alternative explanations, they should show strong correspondence between the strength of their person attribution and their willingness to generalize the behavior across situations.

**Method**

**Participants.** Sixty undergraduate students (29 men and 31 women) at Columbia University were paid for their participation in this study. All participants indicated that English was their native language. There were no sex differences in the results of the study.

**Procedure.** Participants were randomly assigned to either the promotion or the prevention priming condition. Participants in the promotion priming condition were asked to describe their current hopes and aspirations and how they differed from their hopes and aspirations as they were growing up. Participants in the prevention priming condition were asked to describe their current duties and obligations and how they differed from their duties and obligations as they were growing up (see Higgins et al., 1994). No time constraints were introduced for this task.

After completing the priming task, participants were introduced to an ostensibly unrelated task, which was the same causal attribution task as that described in Study 4, except that the following question was added after the causal attribution questions: “Try to imagine Bill from the story you just read behaving in a variety of different situations. In what percentage of those situations do you think that he would act helpfully?” This question was designed to assess generalization of the behavior across situations. After completing this task, participants were debriefed, thanked, and paid.

**Results and Discussion**

After examining participants’ responses to the priming materials, we eliminated 9 people for failing to follow the instructions. This left 51 responses for analysis, 25 in the promotion framing condition and 26 in the prevention framing condition.

Consistent with the pretest and with the results of Study 4, both the person and situation explanations were rated as causing the behavior to a moderately strong degree (Ms = 5.50 and 4.87, respectively). The person explanation was rated somewhat higher than the situation explanation, t(49) = 2.28, p < .05. These ratings were not significantly correlated, r(49) = –.21, p > .15, and were not affected by the priming manipulation (both ts < 1).

As in Study 4, we first examined how regulatory focus affected the relation between the ratings of the person and situation explanations. We predicted a moderation by regulatory focus, such that this relation would be more negative in the prevention priming condition than in the promotion priming condition. To test this prediction, we coded promotion priming as 1 and prevention priming as –1 and conducted a simultaneous regression analysis, predicting the ratings of the person explanation from the ratings of the situation explanation, regulatory focus, and the interaction of these two variables. A significant moderation would be revealed in the significance of the interaction term (Baron & Kenny, 1986).

The results of the regression, presented in Table 4, revealed that the interaction term was indeed significant, B = 0.31, t(56) = 3.27, p < .005, reflecting the fact that the person and situation explanations were less negatively related in the promotion priming condition than in the prevention priming condition.

To illustrate our findings regarding the moderation of the discounting effect by regulatory focus, we regressed the ratings of the person explanation on the ratings of the situation explanation separately within each priming condition. Consistent with our hypothesis and with the discounting principle, a negative association was found in the prevention priming condition, B = −0.49, t(28) = −3.83, p < .001, whereas an insignificant positive association was found in the promotion priming condition, B = 0.14, t < 1, thus showing no evidence of discounting.

As in Study 4, we examined the effect of regulatory focus on participants’ high and low ratings. We reasoned that people in the prevention focus condition would try to decide between the person and situation explanations and thus would rate one of them much higher than the other. People in the promotion focus condition, in contrast, would not feel that they had to decide between the two explanations and thus would feel free to give them similar scores. To test this prediction, we identified for each participant his or her low and high ratings (see Table 5). We conducted a 2 (regulatory focus: promotion vs. prevention) × 2 (type of rating: low vs. high) ANOVA, in which the first variable was between subjects and the second variable was within subjects. This analysis again found, of course, that the high ratings were higher than the low ratings, F(1, 49) = 82.27, p < .0001. It also revealed a Type of Rating × Regulatory Focus interaction, F(1, 49) = 3.12, p = .08. This borderline significant interaction was in the predicted direction, with the difference between the high and low scores (i.e., the

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5 Theoretically, one could also evaluate people’s behavioral generalization from a strong entity attribution by measuring inferences that individuals other than the target actor would behave in a similar way toward the entity, such as asking how many other people would laugh while watching a certain comedy movie like the target did. The scenario used in Studies 4 and 5, however, involved as an entity another person with whom the target actor had a specific relationship (i.e., someone he had seen regularly in the gym) and resulted in a correlation between the person and entity explanations, as described above. Because this entity would have very different relationships with other individuals (from close friends to complete strangers), inferring generalized behavior toward the entity by other actors would not be reasonable. Moreover, inferring generalized behavior by the target actor across other situations is the type of generalization that has received the most attention in the literature (i.e., the classic trait consistency notion).
Table 4
Summary of Hierarchical Regression Analysis for Variables Predicting Ratings of the Person Explanation (Study 5)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>t(56)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>6.38</td>
<td>0.49</td>
<td>12.96</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Situation</td>
<td>-0.17</td>
<td>0.10</td>
<td>-1.78</td>
<td>.0809</td>
</tr>
<tr>
<td>Regulatory focus priming</td>
<td>-0.50</td>
<td>0.49</td>
<td>-3.04</td>
<td>.0039</td>
</tr>
<tr>
<td>Regulatory Focus Priming × Situation</td>
<td>0.31</td>
<td>0.10</td>
<td>3.27</td>
<td>&lt;.0020</td>
</tr>
</tbody>
</table>

range) being higher in the prevention priming condition than in the promotion priming condition.

Overall, these results indicate that situational priming of a promotion or a prevention focus yields a pattern of results similar to that obtained in Study 4 with chronic differences in regulatory focus. In both studies, participants in a prevention focus performed more causal discounting than participants in a promotion focus.

Participants in Study 5 also indicated how likely it was that Bill, the protagonist of the scenario they read, would behave helpfully in other situations. Overall, participants indicated that he was likely to do so for 74% of the situations, and this estimate was not affected by the priming of regulatory focus ($F < 1$). Consistent with Heider’s (1958) theory, this estimate correlated positively with the ratings of the person explanation, $r(49) = .37$, $p < .01$, indicating that a dispositional attribution was used to predict behavior in other situations.

We predicted, however, that this presumably universal use of dispositional attributions would be moderated by regulatory focus. Specifically, we reasoned that participants in a prevention focus would more readily translate their ratings of person causality into behavioral generalizations than would participants in a promotion focus. To test this moderation prediction, we regressed people’s generalization estimates on the ratings of the person explanation, regulatory focus (prevention was coded as -1 and promotion was coded as 1), and the interaction between these two variables. Significant moderation would be revealed in the significance of the interaction term (Baron & Kenny, 1986). The regression analysis (presented in Table 6) revealed the predicted interaction term, $B = -0.05$, $t(56) = -2.79$, $p < .01$, indicating that in the prevention priming condition the relation between the person attribution and behavioral generalization was more positive than in the promotion priming condition.

To illustrate the predicted interaction result, we regressed the generalization score on the ratings of the person explanation within each priming condition. As we predicted, participants in the prevention priming condition showed a strong positive association between the rating for the person explanation and generalizing Bill’s helpful behavior across situations, $B = 0.10$, $t(28) = 3.49$, $p < .002$. In contrast, as we predicted, participants in the promotion priming condition showed no association between the rating of the person explanation and the amount of behavioral generalization, $B = -0.001$, $t < 1$.

These results indicate that the predictive function of attribution, which was assumed to be universal in the classic theories of attribution (Heider, 1958; Kelley, 1973), appears to be true more in a prevention focus than in a promotion focus. We think that this is the case because in a prevention focus, ratings of causality are discounted for alternative explanations and thus reflect a stronger commitment to a cause that can predict future behavior. In a prevention focus, therefore, strong ratings of the person explanation translate into predictions of similar behavior in other situations. In contrast, in a promotion focus, ratings of causality do not reflect a commitment to one explanation as the necessary one. As such, even strong ratings of causality do not translate into behavioral generalizations.

In sum, Studies 4 and 5 showed that when asked about the causes of Bill’s behavior, prevention-focused individuals engaged in causal discounting and clearly differentiated between the person and situation causes. Study 5 also showed that when then asked about how general this behavior might be, they readily made inferences based on the previously identified person cause and predicted more generalized behavior the more they believed in the person cause. Promotion-focused individuals, in contrast, considered both person and situation explanations without strongly committing to any one of them and tended to differentiate less between these causes. When asked to predict Bill’s behavior in other situations, they did not use their previous person attributions to make behavioral generalizations. These results suggest that regulatory focus has important implications not only for the number of causal explanations that are generated and considered but also for the way in which explanations are used in subsequent judgments.

General Summary and Conclusion

According to regulatory focus theory (Higgins, 1997, 1998), a prevention focus is concerned with avoiding mismatches to the goals of safety and security (i.e., carefully avoiding mistakes), whereas a promotion focus is concerned with approaching matches to the goals of advancement and accomplishment (i.e., pursuing all means of gaining success). According to this theory, a promotion focus is concerned with ensuring correct rejections and ensuring against errors of omission, whereas a prevention focus is concerned with ensuring hits and ensuring against errors of omission. Every new hypothesis that one adopts can potentially be right and thus be a hit, but it might also be wrong and thus constitute an error.

Table 6
Summary of Hierarchical Regression Analysis for Variables Predicting Extent of Behavioral Generalization to Other Situations (Study 5)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>t(56)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.46</td>
<td>0.10</td>
<td>4.46</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Person explanation</td>
<td>0.05</td>
<td>0.02</td>
<td>2.73</td>
<td>&lt;.0088</td>
</tr>
<tr>
<td>Regulatory focus priming</td>
<td>0.30</td>
<td>0.10</td>
<td>2.88</td>
<td>&lt;.0059</td>
</tr>
<tr>
<td>Person Explanation × Regulatory Focus Priming</td>
<td>-0.05</td>
<td>0.02</td>
<td>-2.79</td>
<td>&lt;.0076</td>
</tr>
</tbody>
</table>

Table 5
High and Low Ratings by Regulatory Focus Priming (Study 5)

<table>
<thead>
<tr>
<th>Regulatory focus priming</th>
<th>Promotion</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>5.96</td>
<td>6.15</td>
</tr>
<tr>
<td>Low</td>
<td>4.64</td>
<td>4.19</td>
</tr>
</tbody>
</table>
of commission. A hypothesis that one chooses not to adopt can potentially be a true one and thus be a miss or, alternatively, can be wrong and thus constitute a correct rejection. According to regulatory focus theory, promotion focus, because of its concern with ensuring hits and relative little concern with errors of commission, should generate many hypotheses. By the same logic, a prevention focus, because of its concern with ensuring correct rejections and ensuring against errors of commission, should generate fewer hypotheses. Consistent with these predictions, Studies 1 and 3 found that stronger chronic promotion focus (i.e., high ideal strength) was associated with generating more hypotheses, and Study 2 found similar results for situationally primed promotion and prevention focus. In Studies 1 and 2, participants generated hypotheses about the identity of an object in an ambiguous picture. In Study 3, participants generated causal hypotheses (i.e., explanations) about their own past interpersonal behavior.

Studies 4 and 5 examined the implications of the logic of regulatory focus theory for two central attributional functions—discounting of alternative causes and using causal explanations to predict behavioral generalization. We reasoned that in considering plausible, sufficient, unnecessary, and uncorrelated causes, individuals in a promotion focus, who are more concerned with omitting a correct hypothesis than with adopting an incorrect hypothesis, would be willing to simultaneously endorse multiple alternative hypotheses rather than discounting one in favor of another. Individuals in a prevention focus, in contrast, would prefer to select a small number of hypotheses and discount alternatives because of their greater concern with not endorsing a wrong hypothesis than with omitting a correct hypothesis. Our studies confirmed the prediction that regulatory focus, either chronic (Study 4) or induced (Study 5), moderated discounting such that person and situation explanations for a target’s behavior were discounted more in a prevention focus than in a promotion focus.

Because individuals in a promotion focus maintain alternative explanations, they are less likely to think that each of these alternatives is necessary. However, individuals in a prevention focus put more weight on the necessity of one cause, which they then use to make future predictions. Consistent with this reasoning, we found that individuals in a prevention focus, but not individuals in a promotion focus, used their ratings of person causality to predict behavior across situations. Specifically, in Study 5, we found a positive association between the rating of a dispositional explanation of a target’s behavior and predictions of similar behavior in other situations in a prevention focus but not in a promotion focus. Together, these studies suggest that regulatory focus has important consequences for the strategies that people use in dealing with multiple hypotheses—it affects the number of hypotheses that people generate, their tendency to engage in causal discounting, and their use of a dispositional inference for behavior generalizations.

Both hypothesis generation and hypothesis testing have been viewed in the literature as effortful, resource-consuming processes, and indeed, motivation and ability have been shown to function as moderators. For example, in the lay epistemic motivation theory (Kruglanski & Webster, 1996), need for cognitive closure is conceptualized as representing both the motivation and the capacity to engage in laborious cognitive processing. It has been shown that high need for closure is associated both with generating few hypotheses (Kruglanski & Webster, 1996; Maysless & Kruglan-
actually reflect more discounting of the less preferred situational explanation.

It has also been traditionally assumed that causal explanations serve the function of predictability and that people especially strive to establish dispositional attributions so as to predict outcomes in a variety of social situations. Our results suggest a qualification of this principle by showing that in a promotion focus dispositional attributions are not necessarily used for behavior generalization. It is possible that in a promotion focus causal attributions serve a function other than identifying stable dispositions, for example, the function of identifying alternative explanations to be pursued as alternative means of prediction. This "multiple means" function is best achieved by a risky, explorative strategy of identifying as many causal relationships as possible.

Clearly, our model has implications not only for hypothesis generation and hypothesis testing but also for other psychological domains. More risky, less conservative, less cautious strategies are expected in a promotion focus than a prevention focus. Thus, Crowe and Higgins (1997) showed that people in a promotion focus are more likely to use creative strategies in problem solving. Liberman et al. (1999) showed that when the old alternative represents a safe, acceptable option, as in situations involving task substitution and endorsement, promotion focus induces preference for change, whereas prevention focus is associated with seeking stability. Förster, Taylor, and Higgins (2000) showed that in tasks that require both speed and accuracy, a prevention focus increases one's concern with accuracy, whereas a promotion focus increases one's concern with speed. Our research extends this line of reasoning to the important domain of hypothesis generation and discounting.

The classic models of causal inference (Heider, 1958; Kelley, 1973) adopted a metaphor of a person as a scientist, assuming not only that causal inferences are derived in a lay scientific way but also that they serve the scientific function of accumulating knowledge with the final aim of predicting future outcomes and controlling the environment. It should be noted that such scientific inquiry is also served by the more risky strategy of divergent reasoning, in which hypotheses are not rejected even if they initially look somewhat unlikely and seem to be at odds with existing views. It could be that when the goal is secure predictions, errors of commission (predicting a wrong outcome) are experienced as more costly than errors of omission (failing to predict a correct outcome), a situation reflecting a prevention focus. When the goal is to explore new causal connections, however, errors of omission (not identifying a possibility) might be experienced as more costly, reflecting a promotion focus. Our model, then, goes back to the original metaphor of a person as a lay scientist, but it emphasizes an additional different aspect of the scientific activity than the classic models of attribution.

References


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