When Risk Seeking Becomes a Motivational Necessity

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Four studies demonstrate the importance of self-regulatory mechanisms for understanding risk-seeking behavior under loss. Findings suggest that risk seeking becomes a motivational necessity under 3 conditions: (a) when an individual is in a state of loss; (b) when the individual is in a prevention-focused regulatory state (E. T. Higgins, 1997); and (c) when the risky option alone offers the possibility of eliminating loss. In situations involving loss, prevention motivation but not promotion motivation (whether measured or manipulated) was uniquely associated with behaviors that served the motivation to maintain the status quo. When the risky option offered the sole possibility of returning to the status quo, prevention motivation predicted increased risk seeking. However, when a more conservative option was available that also offered the possibility to return to the status quo, prevention motivation predicted risk aversion. When neither option offered the possibility to return to the status quo, prevention motivation was not associated with risky choice. The authors discuss the benefits of complementing existing accounts of risky decision making under loss with regulatory focus motivational mechanisms.

Keywords: regulatory focus, motivation, self-regulation, risky decision making, prospect theory

People are generally risk averse (Arrow, 1971; Bernoulli, 1738/1967; Blais & Weber, 2006; Pratt, 1964; Schneider & Lopes, 1986), so understanding why individuals are often risk seeking under loss has been a goal of psychologists, economists, and others for decades. Furthermore, people's willingness or reluctance to take risks has a number of significant implications across life domains, including health, financial, and political decisions (cf. Klein & Cerully, 2007; Reyna, 2004). In recent years, the risky decision making of individuals under loss has had profound implications not only for the decision makers themselves but also for scores of individuals affected by those decisions—indeed, for the very well-being of the global economy (Landler, 2008). Consequently, a deeper understanding of why and when individuals make risky decisions has the potential to shed light on a number of important social issues.

Perhaps the best known account of risk seeking under loss is provided by prospect theory (Kahneman & Tversky, 1979, 1984). Although prospect theory provides a useful description of the psychophysical mechanisms that may underlie risky decision making, there has been a growing call to complement existing psychophysical accounts with motivational mechanisms to explain why individuals exhibit riskiness under loss (e.g., Bell, 1982, 1985; Cochran & Tesser, 1996; Kluger, Stephan, Ganzach, & Hershkovitz, 2004; Larrick, 1993; Leith & Baumeister, 1996; Loomes & Sugden, 1982, 1987; Lopes, 1987; Schneider, 1992; Schneider & Lopes, 1986). That is the focus of our research.

Specifically, we suggest that regulatory focus theory (Higgins, 1997) provides a valuable motivational framework for understanding risk-seeking behavior under loss. Our perspective complements traditionally "cold" psychophysical and cognitive accounts of risky decision making by highlighting the role of self-regulatory states in determining choice under loss. Our perspective also advances existing "hot" motivational accounts (e.g., Josephs, Larrick, Steele, & Nisbett, 1992; Larrick, 1993; Lopes, 1987) by conceptualizing risky and conservative choices as tactics that operate in the service of underlying motivational systems. Consideration of self-regulatory concerns does not simply suggest moderation of existing accounts of risky decision making under loss. Rather, consideration of self-regulatory concerns specifies motivational conditions that underlie risky and nonrisky decision making under loss, leading to novel predictions not anticipated by prior accounts. Specifically, we posit that risk seeking will result when (a) an individual is in a state of loss (below the previous

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status quo referent point), (b) the individual is in a prevention-focused regulatory state, and (c) the risky option alone offers the possibility of eliminating loss (i.e., getting back to the reference point). We begin by reviewing the existing literatures on choice under loss and on regulatory focus and then examine how a consideration of self-regulatory mechanisms provides insight into the conditions under which individuals are or are not risk seeking and into the motivational processes that underlie such choices.

Below the Status Quo Ante: Loss and Risk Seeking

Attempts to understand risky choice when potential losses are involved have emphasized either cognitive mechanisms or affective and motivational mechanisms. Most generalized utility theories emphasize "cold" cognitive and psychophysical processes in understanding risky decision making (for reviews, see Camerer, 1989; Lopes, 1995). Prospect theory, arguably the most influential cold account of risk seeking under loss, outlines two psychophysical mechanisms (the S-shaped value function; the probability weighting function) to account for the tendency for individuals to exhibit risk seeking under loss (Kahneman & Tversky, 1979). "Hot" motivational accounts of risky decision making have tended to focus on a distinction between a motivation to maximize outcomes versus a motivation to avoid failure (Atkinson, 1957; Lopes, 1987) or the motivation to maintain a positive image of oneself as a competent decision maker (Bell, 1982, 1983; Loomes & Sugden, 1982, 1987; Josephs et al., 1992; Larrick, 1993; Mellers, Schwartz, Ho, & Ritov, 1997).

Lopes and colleagues suggested that psychophysical accounts miss the distinctly psychological nature of what it means to take risks, arguing for the important role of motivation in a two-factor theory of risky choice (Lopes, 1987; Schneider & Lopes, 1986). An approach that grew out of the achievement motivation tradition (Atkinson, 1964; McClelland, Atkinson, Clark, & Lowell, 1953), the two-factor theory proposes that individuals are oriented either toward security (motive to avoid failure) or toward potential (motive to succeed). In this early research on motivation and risky choice, motivational orientations were themselves defined through choices individuals made in the domain of gains (Lopes, 1987; Schneider & Lopes, 1986). These motivational orientations were posited to interact with situationally constrained aspiration levels to predict different patterns of risky decision making.

Lopes (1987) suggested that security-oriented individuals are generally risk averse, although she predicted that a conflict below the break-even point between a desire to avoid bad outcomes (i.e., the dispositional motivation) and to ensure some minimum gain (i.e., a situationally influenced aspiration level) leads sometimes to risk seeking and sometimes to risk aversion. The motivation toward potential, in contrast, generally leads to risk seeking under loss, because the desire for high potential return and the situationally determined aspiration level work in concert (Lopes, 1987; Schneider & Lopes, 1986). Thus, in the two-factor theory for risky choice, motivational orientations toward security or potential can drive risky choice below the break-even point, and, generally speaking, risk seeking under loss will be greater for individuals oriented toward potential than for individuals oriented toward security.

Other motivational approaches have emphasized the need to assess motivation independently of risky decision-making behav-

ior itself. These approaches suggest that the motivation to protect the belief that one is a competent decision maker often drives risky choice. Building on theories that have argued that individuals are motivated to avoid regret (Bell, 1982, 1983; Loomes & Sugden, 1982, 1987), Larrick and colleagues argued (Josephs et al., 1992; Larrick, 1993) that individuals are motivated to avoid regret because regret calls into question whether they have made competent decisions. Individuals are most likely to experience regret when they can compare their outcome with the outcome that might have been obtained had they chosen differently; consequently, this kind of motivation is most likely to influence risky decisions when individuals know they will receive feedback regarding the consequences of both chosen and nonchosen outcomes and when they lack the self-regulatory resources to protect themselves from the threat of regret (Josephs et al., 1992).

This self-protective motivation account makes the clearest predictions in the domain of gains. In the domain of gains, choosing the certain option over a risky option can generally protect against regret, because a certain gain always pays off. Indeed, Josephs et al. (1992) found that in the domain of gains, low self-esteem individuals were significantly more risk-averse than high self-esteem individuals. However, in the domain of losses, there was no difference in risk preference between high- and low-self-esteem individuals. When losses are involved, it is not clear whether the risky or risk-averse option would be more likely to minimize regret. Josephs et al. suggested that in the domain of losses, "there is no clear regret-minimizing strategy . . . subjects may resort to a willy-nilly response strategy" (p. 29). Thus, the self-protective motivation theory cannot easily account for motivational differences in risk preferences in the domain of losses.

Although existing motivational approaches have made important contributions in advancing our understanding of the psychological factors that influence risky decision making under loss, researchers continue to be puzzled as to why increased threats to the status quo sometimes leads to increased risk seeking and sometimes leads to rigidity and risk aversion (Greenhalgh, 1983; March & Shapira, 1992; Roy, 1952; Schneider, 1992; Staw, 1976; Staw, Sandelands, & Dutton, 1981; Stone, 1973). Models have emphasized different factors that might account for these shifting preferences below the break-even point, including attention to different reference points (March & Shapira, 1987, 1992), the impact of available choice alternatives (Thaler & Johnson, 1990), the conflict between dispositional motivation and situationally determined aspiration levels (Lopes, 1987), the interaction between outcome history and problem framing (Sitkin & Weingart, 1995), and the relative magnitude of the probabilities being considered (Tversky & Kahneman, 1992). We suggest that regulatory focus theory (Higgins, 1997) may extend existing motivational approaches and importantly contribute to resolving this puzzle regarding individual risk preferences under loss. We believe that regulatory focus theory has the potential to provide a unifying motivational framework for exploring self-regulatory concerns that affect risky decision making under loss by emphasizing how risk seeking and risk aversion are each tactics that are used under different conditions to serve the same underlying prevention motivational system.

Unacceptable Losses: Prevention Motivation Below the Status Quo Ante

We argue that the tactic of risk seeking under loss operates in the service of self-regulatory strategies. In taking a self-regulatory approach to understanding risk seeking under loss, we emphasize the importance of considering the differential significance of the status quo and the meaning of loss given different motivational systems. What drives behavior under loss is neither the degree of risk that an option entails nor the individual preference to be risk seeking or risk adverse per se; rather, it is about how an option can serve as a means to reach a valued goal. Specifically, we propose that risk seeking under loss can serve a significant motivational need, specifically, the restoration of a previous status quo (i.e., the status quo ante). This need arises under one of the motivational systems described by regulatory focus theory (Higgins, 1997): the prevention focus system.

Regulatory focus theory posits the coexistence of two motivational systems—the promotion and prevention systems—that each serve fundamentally important but different needs. The promotion system is concerned with nurturance needs related to advancement, aspirations (ideals), and accomplishment and is marked by a sensitivity to gains versus nongains. Individuals under promotion focus are more sensitive to positive than to negative changes from neutrality or the status quo. In contrast, the prevention system relates to duties, responsibilities (oughts), and security, and is sensitive to losses versus nonlosses. Prevention-focused individuals are more sensitive to negative than to positive shifts from the status quo (Higgins, 2009). Thus, prevention-focused individuals should be more concerned about falling below the status quo ante—a negative change—than should promotion-focused individuals.

On the surface, the motivations toward either security or potential outlined by Lopes (1987) may seem quite similar to prevention and promotion. However, whereas in Lopes's model, the motivation for potential is akin to the motive to succeed and the motivation for security concerns the avoidance of failure, in regulatory focus theory, both promotion- and prevention-oriented individuals can be oriented toward achievement success (Higgins et al., 2001). What distinguishes them is that achievement success for promotion is an ideal aspiration, whereas for prevention, it is an ought duty. A regulatory focus perspective also makes different predictions from Lopes's two-factor theory, where risk-seeking under loss is predicted to be generally greater for potential-oriented than for security-oriented individuals. We explicate next the alternative predictions of the regulatory focus perspective as to when people will be risk seeking under loss.

Although both promotion- and prevention-oriented individuals can be oriented toward achievement success, at a strategic level, there are differences between promotion and prevention focus with respect to their preferences for using eager approach versus vigilant avoidance strategies, respectively (Crowe & Higgins, 1997; Higgins & Molden, 2003; Liberman, Molden, Idson, & Higgins, 2001; Molden & Higgins, 2005). The eager strategic means preferred by individuals in a promotion focus reflect their concerns with advancement and accomplishment, their pursuit of ideals and growth, and their relative sensitivity to the difference between 0 and +1. Eager strategies serve promotion concerns because they are about enthusiastically pursuing potential gain, because they are

means for moving from 0 to attain +1. The vigilant strategic means preferred by individuals in a prevention focus reflect their concerns with safety and responsibility, their need to guard against mistakes, and their relative sensitivity to the difference between 0 and −1. Vigilant strategies serve prevention concerns because they are about carefully avoiding potential loss, because they are means for maintaining or restoring 0 and stopping or removing −1 (see also Brodscholl, Kober, & Higgins, 2007).

Given the differing sensitivities of the two systems, falling below the status quo is unacceptable for prevention-focused individuals in a way that is not true for promotion-focused individuals. Promotion-focused individuals are particularly sensitive to the presence or absence of positive outcomes. For a promotion-focused individual, the absence of positive outcomes may be represented by 0 (the status quo) or by –1. Although the absence of positive outcomes is problematic for a promotion-focused individual, there is no strong distinction between 0 and –1, because both represent nongains; that is, it is the failure to attain +1 that matters most. In contrast, for prevention-focused individuals, falling below the status quo represents a serious threat to safety and security, given their relative sensitivity to the difference between 0 and −1. Consequently, for prevention-focused individuals, there is a significant difference between 0 and –1. Zero represents the status quo (safety), whereas –1 represents the unacceptable failure to maintain 0.

These differences in the phenomenology of loss for promotion- and prevention-focused individuals have significant implications for the actions they are willing and motivated to take. The primary concern of an individual in a prevention-focused state is maintaining the security of the status quo (i.e., the avoidance of loss). For prevention-focused individuals under loss, acceptable progress is measured by whether it restores or returns them to the status quo (i.e., to 0 or safety). In contrast, promotion-focused individuals are motivated to make progress away from the current state, but the status quo holds no special meaning as the state they want to reach. Rather, acceptable progress is simply measured by whether there is advancement away from the current state toward +1. In this sense, given a current state below the status quo, promotion and prevention individuals should be willing to incur different risks in the pursuit of progress.

We propose, therefore, that the prevention motivational system is critical for explaining risky choice under loss from a previous status quo. When below the status quo ante, individuals in a prevention motivational orientation should do whatever is necessary to return to the previous status quo; opting for a certain loss would be unacceptable. If the motivation to return to status quo ante is primary, it is prevention-focus motivation that should predict risk seeking in the domain of loss, when embracing a risky choice offers the only way to restore the previous status quo.

This prediction advances earlier conceptions of regulatory focus, given that prior work has generally associated the promotion motivational system with a risky bias and the prevention motivational system with a conservative bias (Crowe & Higgins, 1997; Friedman & Förster, 2001), work that has typically involved goal pursuit in the domain of gains rather than in the domain of losses. Given that the strategic and tactical levels of self-regulation are independent; however, risky tactics may operate either in the service of eagerness or vigilance (Scholer & Higgins, 2008; Scholer, Stroessner, & Higgins, 2008). In many contexts, eager strate-

gies are supported by risky tactics and vigilant strategies are supported by conservative tactics (e.g., Molden & Higgins, 2004). However, this will not always be true. For example, when the current state is below the status quo, risky tactics may often operate to support vigilance if they provide the only possibility of returning to safety and security.

This prediction is consistent with recent evidence that individuals in a prevention state display a risky or liberal bias when encountering negativity in a signal detection paradigm (Scholer et al., 2008) and with research implicating the prevention system as being more sensitive to loss-related issues than the promotion system. Research has shown that the endowment effect (loss aversion) is uniquely associated with prevention, not promotion, motivation (Liberman, Idson, Camacho, & Higgins, 1999). In addition, the prevention system has also been shown to be uniquely associated with the probability function in prospect theory, a weighting function that supports caution under possible threat (Kluger et al., 2004). Although this prior work implicates the significance of the prevention system in responding to loss, we are aware of no work that has directly examined the implications of a self-regulatory account for understanding risky decision making under loss.

Available Options: Getting Back to the Status Quo Ante

We have argued that risk seeking under loss may often serve the regulatory concerns of the prevention motivational system. Implicit in this argument is the assumption that the riskier option offers the possibility of getting back to the status quo. Indeed, Thaler and Johnson (1990) have pointed out that the classic demonstrations of risk seeking under loss (e.g., Kahneman & Tversky, 1979) "were always accompanied by an opportunity to get back to the original reference or 'break-even' point" (Thaler & Johnson, 1990; p. 658).

If risk seeking represents a tactic used by prevention-focused individuals to eliminate loss, risk aversion might emerge if the more conservative option offered the same possible outcome of getting back to the break-even point. In other words, if loss avoidance is the primary motivational concern, individuals should prefer whichever option best fulfills this function, regardless of its riskiness. Earlier work, although not explicitly advancing a motivational account, provides support for this conjecture. Thaler and Johnson (1990) showed that when individuals experience loss, choice options that offer the opportunity to get back to the break-even point are particularly attractive, regardless of their riskiness (see also Schneider, 1992).

Consequently, if the motivation to return to the status quo ante is really a driving force for prevention-focused individuals in risky decision making under loss, then the nature of the available options should have a significant impact on their risk taking. If a conservative choice also offers the possibility of returning to the previous status quo, individuals in a prevention-focused state should exhibit risk aversion, as the conservative option offers a "safer" (i.e., more certain) possibility of return (cf. Crowe & Higgins, 1997; Scholer & Higgins, 2008). However, prevention-focused individuals should show a preference for a risky choice if only that choice offers the means for eliminating loss (i.e., restoring safety). Furthermore, if neither option offers the possibility of eliminating

loss, prevention focus should be unrelated to risky choice. Although these shifting preferences are predicted by the present motivational account, they are not directly predicted by psychophysical mechanisms or other existing motivational accounts.

Present Research

We propose that the prevention motivational system is the driving motivational force underlying choice under loss, such that the prevention system but not the promotion system will predict risky decision making under loss. We predict that, in general, the promotion system will be unrelated to risky decision making under loss, because either risky or conservative options could serve the promotion eager strategic concern with advancement away from the current state. Moreover, given our assumption that risk aversion and risk seeking are simply tactics that can be used in the service of some underlying motivation (see Scholer et al., 2008; Scholer & Higgins, 2008), it is not only preferable but essential to assess motivation independently of the choice context. Thus, these predictions diverge significantly from those made by the two-factor theory of risky choice (Lopes, 1987). These predictions also complement accounts that have argued for self-protective motivations in risky decision making in the domain of gains (Larrick, 1993) by making clear predictions in the domain of losses.

Four studies test the proposal that prevention, but not promotion, motivation produces risk seeking under loss when the riskier option offers the sole possibility for eliminating loss (Studies 1–4). When presented with a less risky option that also might eliminate loss, however, prevention-focused individuals should exhibit risk aversion (Studies 3 and 4). These effects were expected to emerge, regardless of whether regulatory focus was measured as a chronic variable (Studies 1, 2, 4) or was experimentally manipulated (Study 3). Furthermore, in a situation in which neither option could eliminate loss, prevention motivation was predicted to be unrelated to risky choice (Study 4).

Method

The procedures were similar across all four studies. We provide a general description of the procedure and materials here and highlight variations in the description of individual studies.

Regulatory Focus Measure

In Studies 1, 2, and 4, participants first completed the regulatory focus strength measure (see Higgins, Shah, & Friedman, 1997). The strength measure is best for the current purposes because it is a general measure of motivation with no relation to how participants make risky choices. Given that we are arguing that it is a general prevention system concern with oughts and safety that underlies risky decision making under loss, it is important to measure this motivation independent of risky choice. Using the strength measure allows for a stringent test of our hypothesis, because there is nothing in the measurement itself that is related to our risky choice dependent variables. Furthermore, it is a widely used measure for assessing the chronic strength of the promotion and prevention systems that has been demonstrated to have both discriminant and predictive validity (Förster & Higgins, 2005; Förster, Higgins, & Idson, 1998; Freitas, Liberman, Salovey, &

Higgins, 2002; Friedman & Förster, 2001; Higgins et al., 1997; Shah & Higgins, 1997; Shah, Higgins, & Friedman, 1998).

The strength measure is an idiographic reaction-time measure that captures the accessibility of ideal and ought self-attributes. Participants were provided with definitions of ideal versus ought selves (*ideal self* is defined as the type of person they ideally would like to be, the type of person they hope, wish, or aspire to be; *ought self* is defined as the type of person they believe it is their duty, obligation, or responsibility to be). They were told that they would be asked to provide attributes that describe their ideal and ought selves. Participants were then asked to list four pairs of ideal and ought attributes in a seemingly random order (i.e., one ideal, two ought, one ideal, one ought, one ideal, one ought, one ideal). 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 possess the attribute (actual/ideal extent) on a 4-point scale (1 = *slightly*, 2 = *moderately*, 3 = *a great ideal*, 4 = *extremely*). Similarly, 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. Participants were told that the attributes describing the ideal self had to be different from those describing the ought self and that all attributes were to be provided as quickly and accurately as possible.

The computer measure records the time each participant takes to produce each attribute and make the corresponding extent determinations. Because of the nature of the reaction-time measure, promotion and prevention strength scores tend to be highly correlated. A high correlation can work against obtaining predicted differences, making ours a conservative approach to hypothesis testing (Tabachnick & Fidell, 2007). Consequently, we report all analyses using two analytic approaches: the data analytic approach traditionally cited in the literature (Förster & Higgins, 2005; Förster, Higgins, & Idson, 1998; Friedman & Förster, 2001; Freitas et al., 2002; Higgins et al., 1997; Shah & Higgins, 1997; Shah, Higgins, & Friedman, 1998) and a method in which we first z-score the reaction times before creating overall promotion and prevention scores. This latter approach reduces the overall correlation between promotion and prevention strength by 21%. The mean correlation using the traditional approach was 0.86, and the mean correlation using the z-score approach was 0.71. The pattern of data is consistent across both approaches. Furthermore, the multicollinearity diagnostics for both approaches fall into an acceptable range (e.g., variance inflation factors [VIF] well below 10; Cohen, Cohen, West, & Aiken, 2003).[1] In addition, it should be noted that the same pattern of findings is replicated when regulatory focus is experimentally manipulated rather than measured chronically using reaction times (Study 3).

Traditional approach. All reaction-time measures were first transformed using a natural logarithmic transformation (see Fazio, 1995; Judd & McClelland, 1989). Then one total ideal strength (promotion strength) score and one total ought strength (prevention strength) score were calculated by summing attribute reaction times and extent reactions times (e.g., ideal extent and actual/ideal extent) across the attributes, following the procedures of Higgins, Shah, and Friedman (1997).

z-score approach. Prior to creating the overall scores, we first z-scored each reaction time (for each attribute) before summing and averaging it along the ideal and ought dimensions.

For both approaches, following the procedures recommended by Higgins et al. (1997), promotion and prevention subscale scores were calculated by averaging the response times for the first three ideal-self attributes and the first three ought-self attributes. We used the response times of the first three attributes because output primacy is one criterion for chronic accessibility (see Higgins, 1996). Note, however, that an analysis using the response times of all of the attributes produced essentially the same pattern of results. As is typically done, we reversed the signs for promotion and prevention strength such that higher scores indicated increased strength. Cronbach's alpha for each subscale (promotion strength and prevention strength) was calculated for each study. For the promotion strength subscale (the nine response times for the promotion attribute questions), the mean Cronbach's alpha was 0.71; for the prevention strength subscale (the nine response times for the prevention attribute questions), the mean Cronbach's alpha was .68. This reliability is comparable to that reported in other published studies (e.g., Freitas et al., 2002). After completing the strength measure, participants received instructions from the experimenter for what was described as a second study.

Assessing Risk Seeking Under Loss

The experimenter informed participants that they had earned $5 for completing the first study and that they could either terminate the study or invest their $5 in a second, stock-investment study. If they decided to invest their money, they would receive information about its performance from a computer simulating real-world conditions. Participants were told that people typically earned $7 in the stock-investment study but that there was a chance they could lose the $5 they had invested or even more. If they lost money, however, they could eliminate the loss by completing another study that involved completing 20 pages of questionnaires (cf. Thaler & Johnson, 1990). In other words, the conditions were set so that participants believed that it was credible that they could really lose money.

If participants decided to invest, they returned the $5 to the experimenter as the initial investment and were directed to begin the investment study on the computer. Thus, participants began the stock-investment study with a status quo of $5. A manipulation check at the end of each study ensured that this perception of the status quo as $5 was correct. Participants were asked to indicate (in a free response format) the total amount of experienced loss. Consistent with a status quo ante of $5, of participants who were told that their investment was down $4 (the standard loss condition in the current studies), 96% correctly indicated that the loss was $9 (rather than $4)—loss of their initial $5 investment plus an additional $4.

In total, 146 of 175 participants (83%) elected to continue with the investment study. On the basis of their completion of a demographics questionnaire, there were no significant differences be-

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[1] All analyses simultaneously enter promotion and prevention strength into the model (thus accounting for the shared variance due to individual differences in reaction times).

tween participants who terminated versus continued the study in terms of gender (47.8% female vs. 39.2% female, respectively), age (Ms = 20.1 and 20.2 years, respectively), self-reported experience in financial investing (Ms = 2.3 and 2.5, respectively, on a 5-point Likert scale), or their promotion strength (Ms = –73.1 and –72.7, respectively, transformed reaction-time measure) or prevention strength (Ms = –74.0 and –75.1, respectively). The most common reason given by participants who terminated the study was that they felt they could better use their time elsewhere. In the following studies, we report data from only participants who completed the full study. Preliminary analyses produced no significant main effects or interactions involving gender and age, so these variables were excluded from the reported analyses.

In the stock-investment scenario, participants were given a choice to invest in one of two different stocks presented in random order. This initial choice was provided simply to allow the placement of participants in a position above or below the status quo. Stock 1 was described as giving investors on average a 50% chance of gaining $24 and a 50% chance of losing $7. Stock 2 was described as giving investors on average a 90% chance of gaining $10 and a 10% chance of losing $5. The expected value of these stocks was equivalent ($8.50), but they differed in variance, which is one way to operationalize risk (var. = 121.3 and 3.3, respectively; see March, 1988; March & Shapira, 1987). It is interesting that 74% of participants preferred the conservative choice, consistent with the notion that individuals are generally risk averse (e.g., Blais & Weber, 2006; Lopes, 1987); this choice was not predicted by promotion or prevention strength.

Participants saw the stock results unfold on a computer display that updated stock performance every 12 s. After tracking stock performance for 60 s, participants were shown a summary page that displayed their position after the first investment and offered a second investment option. Information regarding the success of the first stock choice was varied across the studies. Our key dependent measure was participants' second investment decision after learning the results of their first choice.

At the conclusion of the stock-investment study, all participants were thoroughly debriefed, thanked, and paid. All participants received $7 (what we had stated as the average payout) for participation in the stock-investment study.

Study 1

Method

Participants and design.   Thirty-five (76%) of the individuals (19 women, 16 men) who completed the regulatory strength measure participated in the stock-investment task. After investing their $5 in their first stock pick, participants were informed that "your stock is *down $9* in total since your initial investment." In other words, all participants had lost their original $5 investment and an additional $4. Participants were then given a choice to invest in one of two stock options that had the same expected value ($2) but differed in their riskiness. The riskier option gave a "25% chance of gaining $20 and a 75% chance of losing $4" (var. = 108), whereas the conservative option gave a "75% chance of gaining $6 and a 25% chance of losing $10" (var. = 48). Whereas the conservation option could not eliminate the $9 loss, the riskier option potentially could. In rating the perceived riskiness of the two options (1 = *conservative*,

5 = *risky*), participants reported seeing the former as riskier than the latter option (M_{risky} = 4.1, SD = 1.07; $M_{conservative}$ = 2.3, SD = 1.20), $t(34)$ = 5.98, p < .001. An independent pilot test (N = 20) also confirmed this difference in risk perception (M_{risky} = 4.03, SD = 0.92; $M_{conservative}$ = 2.21, SD = 1.30), $t(30)$ = 4.43, p < .01.

Regulatory focus strength.   Using the traditional analytic approach, we determined that the mean prevention strength score was –72.1 (SD = 2.7, skewness = –.070), and the mean promotion strength score was –73.0 (SD = 2.7, skewness = .242; r = .73; VIF = 2.13). Using the z-score approach (the mean is always at zero), we determined that the correlation between prevention strength (SD = 5.31, skewness = –1.07) and promotion strength (SD = 4.85, skewness = –.55) dropped substantially (r = .54, VIF = 1.41).

Results and Discussion

Given a dichotomous dependent measure (0 = *conservative choice*, 1 = *risky choice*), we conducted a logistic regression, testing prevention strength while controlling simultaneously for promotion. Because the regulatory focus strength measure is a reaction-time measure, entering both prevention and promotion strength into the model simultaneously allows us to control for the shared variance due to individual differences in overall reaction times. As predicted, prevention strength increased the odds of choosing the riskier option (odds ratio [OR]$_{traditional}$ = 8.02, $p_{traditional}$ < .02; OR$_{z\text{-score}}$ = 1.39, $p_{z\text{-score}}$ < .01). To illustrate these results, we present the results for individuals high and low in prevention strength based on a median split; individuals low in prevention strength chose the riskier stock 41.6% of the time, whereas individuals high in prevention strength chose the riskier stock 66.2% of the time (see Figure 1). This study provides initial support for the hypothesis that the prevention motivational system is associated with risk seeking under loss. When the riskier option
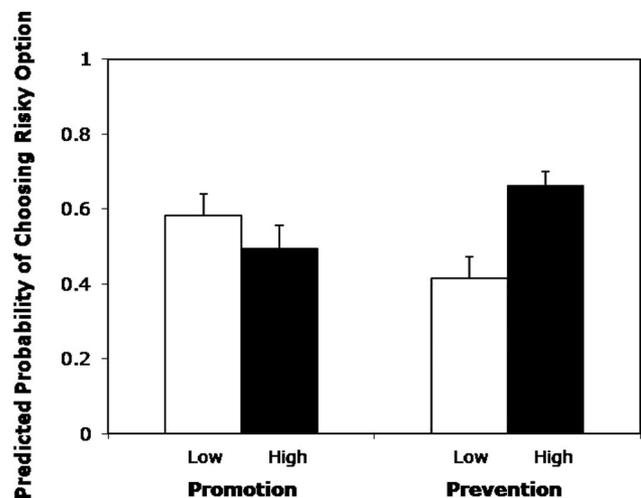

Figure 1.   Predicted probability of individuals choosing the risky option by strength of regulatory focus (Study 1). We conducted a median split on prevention and promotion strength to create "low" and "high" groups; the figure displays the mean predicted probability for each group. Error bars represent one standard error.

was the only one allowing a possible return to the status quo ante, prevention motivation predicted increased risk seeking.

It was unexpected that promotion strength decreased the odds of choosing the risky option ($OR_{traditional} = .18$, $p_{traditional} < .04$; $OR_{z\text{-score}} = .79$, $p_{z\text{-score}} < .06$). Individuals with low promotion strength chose the riskier stock at a rate of 58.3%, compared with 49.5% for individuals high in promotion strength. In the four studies we report in this article, however, this was the only study in which this relationship was found. Given that this was an unreliable finding (as shown by the results of a combined analysis across studies that we report in the general discussion), we do not try to account for this particular result.

Is it possible that the differences found in this study could be driven by motivational differences in the individuals who decided to invest (i.e., to participate in the study)? One potential alternative explanation for our findings is that prevention-focused participants become risk seeking after loss not because of the motivation to return to the status quo ante per se, but because they interpreted the initial decision as an obligation not to lose the $5. Participants higher in prevention strength may be more likely to interpret the opportunity to invest in the second study as an obligation; if so, then we should observe a significant mean difference in the prevention strength scores between those who decided to stay and those who did not. However, we did not observe this difference, $t(46) = 0.23$, $p > .8$ ($M_{stay} = -72.91$, $SD = 3.73$; $M_{Stop} = -73.21$, $SD = 3.28$). We also did not observe any mean difference for promotion strength scores between those who decided to stay and those who did not, $t(46) = 0.43$, $p > .8$ ($M_{stay} = -74.23$, $SD = 3.17$; $M_{Stop} = -73.51$, $SD = 2.98$). Therefore, the significant predictive power of prevention strength for risk-seeking behavior after loss cannot be easily explained by the initial decision to participate in the study. In addition, for participants who decided not to stay, we asked their reasons for not investing in the stock investment study. Most of these participants explained that their major concerns were about the value of participating in the study versus pursuing other activities in their lives. Thus, there is not evidence to suggest that the sample of participants who decided to invest in the study differed on the critical motivational variables.

Another alternative hypothesis for our findings is that promotion- and prevention-focused participants differ in their initial choice, the first investment option used to manipulate the psychological state of loss. One could argue that promotion-focused participants are more likely to choose the risk-seeking option as the initial choice, whereas prevention-focused participants are more likely to choose the risk-averse option. After the initial loss, prevention-focused participants may be simply following a heuristic to switch their choice after failure and thereby display a bias toward the risk-seeking option. In other words, this alternative account argues that the link between prevention-focus and risk-seeking after falling below the status quo is simply driven by the correction heuristic. Prevention-focused participants may switch from their default preference for the risk-averse option because they learn from the prior decision that the conservative option leads to loss (Erev & Haruvy, in press).

However, we did not observe any supporting evidence for this account. First, neither promotion strength nor prevention strength predicted the initial preference. Indeed, consistent with prior research (Blais & Weber, 2006; Camerer, 1989; Lopes, 1987), the majority of the participants (78.3%) preferred the conservative

choice at baseline. Second, we conducted a supplementary regression analysis by controlling for the initial investment decision; the predicted association between prevention strength and risk seeking after loss was even stronger in this analysis ($OR_{traditional} = 8.52$, $p_{traditional} < .02$; $OR_{z\text{-score}} = .79$, $p_{z\text{-score}} < .01$). Third, we also conducted a hierarchical linear modeling analysis by treating the Time 1 initial decision and the decision after loss as within-subject variables. At the within-subject level, we created a dummy variable ($0 = before\ loss$; $1 = after\ loss$). We tested a random intercept and coefficient model by using promotion and prevention strength scores as Level 2 between-subject predictors. The only significant effect was that prevention strength significantly moderated the effect of the loss experience in predicting the critical (Time 2) investment decision. People high in prevention strength were more likely to shift toward the risky option after the loss experience ($B_{traditional} = .59$, $SE_{traditional} = .29$, $t_{traditional} = 1.92$, $p_{traditional} < .05$; $B_{z\text{-score}} = .67$, $SE_{z\text{-score}} = .41$, $t_{z\text{-score}} = 2.01$, $p_{z\text{-score}} < .05$). In contrast, the initial decision did not interact with prevention strength to predict risk seeking.

A third possible alternative explanation is that prevention-focused participants are risk seeking under loss not because of the motivation to get back to the status quo but because the loss leads to greater negative affect relative to promotion-focused participants. After experiencing a loss below the status quo ante, prevention-focused participants, who are particularly sensitive to negative information, may experience a significant level of negative affect. Perhaps it is not so much the motivational necessity of getting back to the break-even point that is driving the risk-seeking preference of prevention-focused participants but the intensified negative mood that results from their prevention concerns (Liberman, Idson, & Higgins, 2005). Indeed, Leith and Baumeister (1996) have found that negative mood can impair functional self-regulation processes and lead to increased risk taking. On the other hand, some other prior work would suggest that this potential mood difference might lead to increased risk aversion rather than risk seeking (Lerner & Keltner, 2000). To respond to these alternatives, it is important to measure directly and control for mood. In Study 2, we included both gain and loss conditions and measured positive and negative affect following gain or loss.

Study 2

If risk seeking serves as a tactic to regain safety (i.e., the status quo ante) for the prevention system, then it should be adopted only under loss but not under gain. Although Study 1 demonstrated that prevention individuals can be risk seeking under loss, it did not test risk seeking under gain. Study 2 was designed to test the prediction that the prevention motivation system produces risk seeking under loss but not under gain. Under gain, risk seeking should not be strongly associated with prevention motivation to maintain the status quo. It is only under loss that risk seeking develops motivational value for prevention-focused individuals as a way to restore the status quo. In addition, we included measures to test an alternative explanation that the difference shown between our promotion and prevention participants was produced by differences in mood rather than by strategic differences due to underlying motivational orientations.

Method

Participants and design. Forty (81.6%) participants (28 women, 12 men) participated in the full study. Procedures were identical to Study 1 except that participants were randomly assigned to experience either loss (as in Study 1) or gain ("your stock is UP $4. The total value is $9 now") from their first stock choice. Participants then chose from the same set of stock options described in Study 1. As in Study 1, participants perceived the risky option as riskier than the conservative one (M_{risky} = 4.1, SD = 0.81; $M_{conservative}$ = 2.7, SD = 1.20), $t(39)$ = 5.61, p < .001. Following the stock-investment task, participants completed the PANAS (Positive and Negative Affect Schedule) questionnaire (Watson, Clark, & Tellegen, 1988) to evaluate current mood, as well as an item to measure the general positivity of the experimental experience (1 = *not at all positive*, 7 = *very positive*).

Regulatory focus strength. Using the traditional analytic approach, we determined that the mean prevention strength score was –74.96 (SD = 3.53, skewness = .374) and the mean promotion strength score was –75.46 (SD = 3.53, skewness = –.478; r = .84, VIF = 3.48). Using the z-score approach, we found that the correlation between prevention strength (SD = 5.16, skewness = –.413) and promotion strength (SD = 5.58, skewness = –1.439) dropped to r = .77, VIF = 2.46.

Results and Discussion

Prevention strength again predicted increased risk seeking under loss but not under gain. We conducted a logistic regression including the interaction terms of Promotion × Outcome Valence Condition and Prevention × Outcome Valence Condition (Baron & Kenny, 1986). Only the interaction between prevention strength and manipulated outcome valence condition yielded a marginally significant effect, such that high-prevention-strength individuals were more likely to choose the riskier stock in the loss than in the gain condition (p = .09). Given the marginally significant result, we checked and found that random assignment had not perfectly controlled for participants' experience in the financial market. When we controlled for participants' self-reported experience, the interaction effect of prevention strength and manipulated outcome valence condition was stronger and statistically significant ($OR_{traditional}$ = .007, $p_{traditional}$ < .02; $OR_{z-score}$ = .005, $p_{z-score}$ < .04; see Table 1). After controlling for self-reported experience in finance, prevention strength significantly predicted riskier choice in the loss condition. In the loss condition, prevention strength increased the odds of choosing the risky option ($OR_{traditional}$ = 15.18, $p_{traditional}$ < .08; $OR_{z-score}$ = 12.90, $p_{z-score}$ < .09), whereas in the gain condition, prevention strength decreased the odds of choosing the risky option ($OR_{traditional}$ = 0.45, $p_{traditional}$ < .09; $OR_{z-score}$ = 2.41, $p_{z-score}$ = .22). Individuals with a strong prevention focus chose the riskier stock at a rate of 75.2% under loss, but this percentage decreased to 37.9% under gain (see Figure 2).

Mood checks. Supporting the validity of the mood measure, participants found the experimental experience to be more positive in the gain than in the loss condition (Ms = 6.6 and 4.7, respectively), $F(1, 39)$ = 8.01, p < .01. However, scores on the positive and negative mood subscales of the PANAS revealed no difference between the gain and loss conditions (*ns*), and neither promotion nor prevention strength predicted scores on the positive affect or

Table 1

Summary of Logistic Regression Analysis for Strength of Regulatory Focus Predicting Stock Investment Preference Above and Below the Break-Even Point (Study 2)

Predictor	B	SE B	p	e^B
Traditional approach, $\chi^2(6, N = 40) = 12.407$				
Investment experience	0.761	0.370	.040	2.139
Above or below break-even	0.347	0.897	.699	1.414
Promotion strength	0.294	0.922	.750	1.342
Prevention strength	2.502	1.473	.090	12.201
Valence[a] × Promotion Strength	−0.041	1.635	.980	0.960
Valence[a] × Prevention Strength	−5.005	2.097	.017	0.007
z-score approach, $\chi^2(6, N = 40) = 13.476$				
Investment experience	0.782	0.364	.032	2.187
Above or below break-even	0.926	0.765	.224	2.533
Promotion strength	−0.881	1.146	.442	0.414
Prevention strength	1.280	1.302	.326	3.297
Valence[a] × Promotion Strength	3.136	2.161	.147	23.007
Valence[a] × Prevention Strength	−2.767	2.556	.041	0.005

Note. e^B = odds ratio. Investment experience, promotion strength, and prevention strength are mean centered; condition (above or below break-even) is effect coded (−1 = *below break-even*, 1 = *above break-even*). Dependent measure is effect coded (1 = *risky*, 0 = *conservative*).
[a] Above or below the break-even point.

negative affect measures. Moreover, a logistic regression to predict stock option choice with the general positive experience measure was not significant (OR = .82, *ns*), suggesting that the stock option decision was not likely driven by purely affective processes. Controlling for mood, the interaction effect of prevention focus and outcome valence manipulation on risk preference remained the same: using the traditional approach, $p_{traditional}$ < .05; using the z-score approach, $p_{z-score}$ < .08.

This second study provides further support for the proposal that it is prevention-focused motivation that is associated with risk preference under loss. Prevention-focused participants, but not promotion-focused participants, displayed risk-seeking behavior under loss. Furthermore, the association between prevention strength and risk seeking was observed only under loss but not under gain.

It is interesting that promotion strength did not predict preferences across either the gain or loss conditions. This underscores that the promotion and prevention systems are orthogonal and thus provide independent, not opposite, accounts for explaining people's risky preferences. The fact that prevention-focused participants displayed a shift toward the conservative option from loss to gain does not imply the opposite for promotion-focused participants.

From previous research in other areas (e.g., Crowe & Higgins, 1997; Molden & Higgins, 2004), however, one might expect that promotion-focused participants would display a risky bias in the domain of gains. Although we are hesitant to make too much of this null effect, this finding does seem to indicate the need for future research to identify the conditions under which risky versus conservative options clearly support the eager strategies of promotion-focused individuals. Although previous research has often equated eagerness with riskiness (cf. Crowe & Higgins, 1997), the current research, as well as recent developments (e.g.,
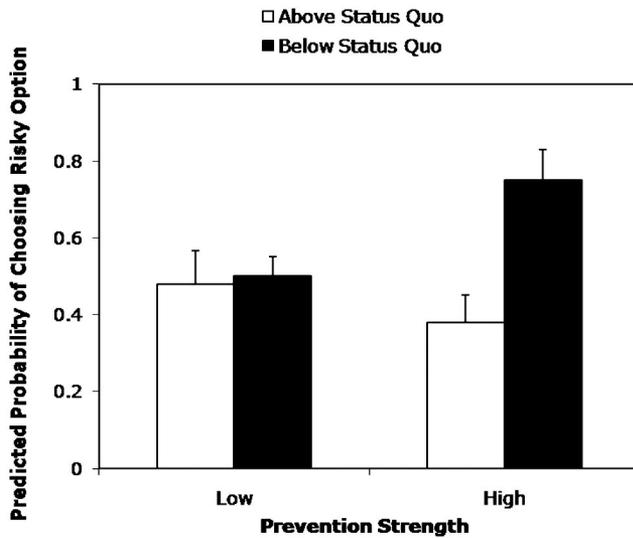
Figure 2. Predicted probability of individuals high and low in prevention strength (as determined by median split) choosing the risky option above versus below the status quo (Study 2). Error bars represent one standard error.

Scholer & Higgins, 2008; Scholer et al., 2008), makes clear that risky and conservative actions are simply tactics that can operate to support either vigilance or eagerness. It is not obvious which option (risky or conservative) best supports the strategic concern with eagerness and advancement in this case. Given that there may not be a single tactic that best serves promotion concerns under loss, promotion strength may not be predictive of preference in this particular situation. Although the focus in the current article is on the role of prevention motivation under loss, these issues of understanding how and when eager strategies are supported by risky versus conservative tactics are important to consider and explore in future research.

In sum, this study allowed us to address two potential alternative accounts of the findings from the first study. Prevention motivation was not associated with risk-seeking preference in general, but only when the motivational conditions were appropriate: in the domain of losses and when the risk-seeking option provides the only possibility of returning to the status quo ante. In the domain of gains, prevention motivation predicted conservative rather than risky choice. Furthermore, there were no differences in negative or positive affect between promotion versus prevention participants under gain or loss. Thus, it appears that the prevention association with risk under loss is not driven by affective mechanisms.

In the next study, we sought to directly test whether it was the motivational concern of "getting back to break-even" that was driving choice under loss for prevention-focused participants. If this is the primary motivation behind risk preference under loss, then it should predict choices that offer the possibility to get back to the status quo ante, irrespective of their riskiness. When the risky option is the only option that provides a potential to fulfill this need, prevention-focused participants should choose the risky one. However, when both the conservative and the risky options offer the potential of getting back to the break-even point, prevention-focused participants should choose the conservative

option because it provides a "safer" probability of fulfilling this need. Study 3 was designed to test this account. Study 3 also experimentally manipulated promotion and prevention rather than measuring the strength of participants' chronic promotion and prevention orientations.

Study 3

Across Studies 1 and 2, the likelihood of choosing the riskier option increased as prevention strength increased; in contrast, the likelihood of choosing the riskier option either decreased as promotion strength increased (Study 1) or was unrelated to promotion strength (Study 2). Risk seeking was exhibited by individuals high in prevention strength only in contexts in which they fell below the break-even point. In a gain situation, where conservative choices best maintained a satisfactory status quo, prevention strength was associated with risk aversion.

Our motivational account proposes that risk-seeking is simply one tactic that serves the prevention system motivation. In the first two studies, only the riskier option provided the opportunity to eliminate loss. Our participants lost $9, and, at best, the conservative option could only provide a gain of $6, not enough to eliminate the loss, compared with the potential $20 gain offered by the riskier option. If risk seeking under these conditions was produced by the motivation to eliminate loss, then changing the potential of the more conservative option to eliminate the loss fully might alter choice behavior. In Study 3, we included a conservative option that also could potentially eliminate the loss to test the prediction that individuals high in prevention (but not promotion) motivation would shift their preference to a conservative, more certain option when it allows fulfillment of the primary motivational need (i.e., restoring safety). Furthermore, we made this study a particularly stringent test of our "motivated tactic" hypothesis by including a conservative option that restored the exact status quo ante ($0) rather than providing the possibility of even minimal gain.

In addition, we wanted in this study to provide clearer evidence of the causal role of prevention motivation in producing these choices. Thus, we manipulated rather than measured participants' regulatory states. The manipulation of regulatory focus not only allows for greater internal validity but also provides critical evidence that either chronic or situationally induced prevention motivation can impact choice under loss. In the world outside the lab, it may often be that the prevention system becomes temporarily more accessible, for example, through work tasks that emphasize safety or a culture that highlights duties and responsibilities. We argue that what is important for understanding risky choice is an individual's motivational state, regardless of whether that state arises from chronic concerns or temporary situational conditions. Thus, a manipulation of regulatory focus provides an analogue test of how conditions may often unfold in the "real" world.

Method

Participants and design. Sixty-seven (81.7%) of the participants (24 women, 43 men) completed the full study. Participants were randomly assigned to condition in a 2 (regulatory focus: promotion, prevention) × 2 (choice options: risky only possible return, both possible return) between-subjects design. Procedures

were identical to Study 2 except that regulatory focus was manipulated rather than measured and a different conservative option was used. Regulatory focus was manipulated by asking participants to write several short essays on their current aspirations, ideals, and hopes and how these hopes, aspirations, and ideals had changed since childhood (promotion manipulation) or their current obligations, duties, and responsibilities and how these obligations, duties, and responsibilities had changed since childhood (prevention manipulation; see Freitas & Higgins, 2002; Higgins, Roney, Crowe, & Hymes, 1994).

In the "both possible return condition," participants were presented with a conservative option that offered a "65% chance of gaining $9 and a 35% chance of losing $11" (var. = 60) and therefore offered the possibility of eliminating the exact amount of loss. In the "risky only possible return" condition, the risky and conservative options were the same as those used in Studies 1 and 2.

Across the pairs of stock investment options, participants' subjective perceptions of the risk level of the stock option were consistent with the variance data: in the "risky only possible return" condition, $M_{risky} = 4.2$ ($SD = 0.91$), $M_{conservative} = 2.4$ ($SD = 1.03$), $t(66) = 9.98$, $p < .001$; in the "both possible return" condition, $M_{risky} = 4.2$ ($SD = 0.92$), $M_{conservative} = 2.4$ ($SD = 1.03$), $t(66) = 9.72$, $p < .001$.

Results and Discussion

Manipulation check. We conducted a manipulation check of the regulatory focus ideals versus oughts essay task by examining the content of the essays. According to regulatory focus theory (Higgins, 1997), we would not expect differences in affective positivity between the promotion versus prevention essays, but we would expect differences in whether goals are represented as ideals versus oughts. In both conditions, participants were writing about desired end states; the content of these desired end states is orthogonal to regulatory focus (cf. Higgins, Bond, Klein, & Strauman, 1986). For example, getting an A in a course could be either a promotion or prevention goal; it is the representation of that goal as an ideal or an ought that is critical for manipulating motivational state. Consequently, to test differences in representation, we counted the frequency of promotion versus prevention words on the basis of the word-frequency analysis practice recommended by Pennebaker and King (1999). The word list was developed by Appelt and Higgins (2009) to identify words commonly used within the promotion versus prevention systems.[2] Recently, Janus and Zou (2009) adapted this list to study physicians' personal promotion and prevention orientation based on qualitative interviews. Physicians that were categorized as promotion focused versus prevention focused on the basis of their use of promotion or prevention words showed characteristic regulatory focus tendencies (e.g., use of eager versus vigilant strategies, respectively) that would be expected based on other validated measures (e.g., Higgins et al., 2001; Higgins et al., 1997). More generally, this word-frequency analysis has proven to be valid in identifying the underlying individual characteristics in several different domains of psychological analyses (Peterson, Seligman, & Vaillant, 1988; Tetlock, Peterson, & Berry, 1993).

Across the two conditions, there were no differences in the length of the essays ($p > .73$). On average, each essay was 350 words in length. Based on the affective categories developed by Pennebaker, Francis, and Booth (2001), there were also no significant differences in the use of either positive or negative affective words (both $ps > .6$), However, as expected, there was strong evidence for differences in how these desired end states were represented. In the promotion essay condition, promotion words ($M = 0.74$, $SD = 0.93$) appeared significantly more often than prevention words ($M = 0.05$, $SD = 0.18$), $t = 4.72$, $p < .001$. In the prevention essay condition, prevention words ($M = 0.39$, $SD = 0.07$) appeared significantly more frequently than promotion words ($M = 0.05$, $SD = 0.21$), $t = 2.96$, $p < .001$. Thus, we feel confident that our manipulation was successful in temporarily creating promotion versus prevention motivational states.

Primary analysis. A logistic regression analysis yielded the predicted interaction between manipulated regulatory focus and stock option ($OR = .147$, $p = .06$). Under the prevention manipulation, 63% of participants in the "risky only possible return" condition chose the risky option compared with 27% in the "both possible return" condition, $\chi^2 = 4.611$, $\Phi = .12$, $p = .03$. This shift was not observed in the promotion condition, $\chi^2(1, N = 67) = .28$, $p > .20$ (see Figure 3), supporting our prediction that prevention system motivation uniquely predicts risk preferences under loss.

This study provides additional support for our proposal that it is the prevention motivation to get back to the status quo ante that is driving risk preference under loss. When the risky option provides the only possibility of return to the status quo ante, it is the best tactic to serve prevention motivational concerns. However, if the conservative option also offers the possibility of return, it provides a safer (more certain) option of meeting the dominant motivational need. Consequently, individuals in a prevention focus were more likely to choose the risky option when it offered the only possibility of getting back to the status quo ante. However, when a conservative option was available that provided the possibility of getting back to the status quo ante exactly (even with no additional gain), individuals in a prevention focus were more likely to choose the conservative option. We did not observe this shift for individuals in a promotion focus.

This finding provides clear support for the need to consider motivation when examining risky decision making (Larrick, 1993) and demonstrates the power of the current approach in predicting risk preference under loss. In addition, the present approach is able to predict risk preference by assessing motivation independently of risky choice in the domain of gains (cf. Lopes, 1987), making clear the distinction between underlying motivation and the tactics that may serve it. By making clear predictions in the domain of loss and by assessing or manipulating motivation independent of risky choice, regulatory focus theory complements and adds value to extant motivational accounts of risk seeking. Furthermore, given that situations and organizations can differ significantly in their emphasis on "ideals and aspirations" or "duties and obligations"

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[2] Promotion words were ideal/ideally, hope, wish, advance/advancement, hit, promote/promotion, aspiration/aspire, add, maximize, open, attain/attainment, support, nurture, challenge/challenging, new, and novel; prevention words were ought, responsibility, necessity, prevent/prevention, vigilant/vigilance, protect/protection, cautious, careful, avoid/avoidance, duty, obligation, defend, safety, security, must, should, omit, and stable.
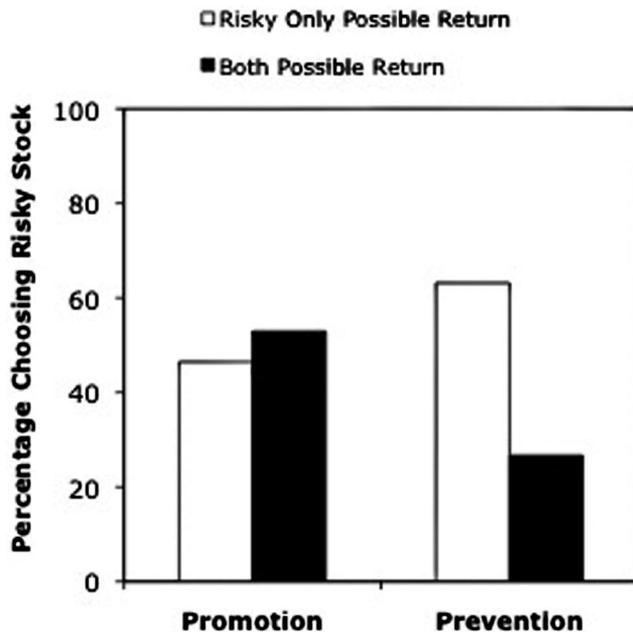
Figure 3. Actual percentage of participants choosing the risky stock by manipulated regulatory focus and option type (risky only possible return, both possible return; Study 3).

(Brockner & Higgins, 2001), the direct manipulation of regulatory focus not only provides causal support for the relation between prevention motivation and risk preference but also provides insight into thinking about how individual risk preferences may be influenced in the real world.

Study 4

The first three studies provide evidence that prevention motivation, not promotion motivation, is related to risky choice when individuals are in a state of loss. We have shown that when the risky option is the only one that can eliminate loss, prevention motivation predicts risk seeking. On the other hand, when the conservative option can also eliminate loss, prevention motivation predicts risk aversion. We have argued that this shifting preference reflects the tactical nature of the risky and conservative options. The options themselves are meaningful only to the extent that they can serve the underlying vigilant strategic and system concerns with returning to the safety of the status quo ante. This suggests that it is not the case that individuals in a prevention focus are motivated to be conservative or risky per se. Rather, it is the underlying motivation that is fundamental for predicting their risky choice.

In Study 4, we wanted to test the bounds of this motivational argument by presenting participants in a state of loss with two options (risky and conservative), neither of which offered the possibility to eliminate loss. This represents a condition in which neither option serves the prevention system concern of returning to the status quo ante. If the pattern we have observed in the earlier studies is driven by the underlying motivation of prevention-focused participants to eliminate loss rather than by a motivation to be conservative or risky per se, then prevention focus should not be related to choice in this situation. In other words, we are suggest-

ing that questions about whether someone will be risk seeking or risk averse may be missing the mark; the real question is about how the options serve the underlying motivation. Thus, this prediction highlights the strength of considering the motivational processes underlying risky choice under loss.

We should note that within the prevention system, a preference for a conservative option when the starting state is at 0 may generally make sense. Under normal circumstances, if people are motivated to maintain the status quo, a default preference to be conservative will tend to serve strategic vigilance. However, when the starting state is loss (-1), the notion of a default tactic does not make sense from a strong motivational perspective. In loss, the tactic that makes sense is the one that can eliminate loss and restore the status quo. Whether that tactic is risky or conservative is secondary to that function. Thus, when neither option can serve the perceived necessity to get back to safety, prevention focus should be unrelated to choice.

This study was also designed to begin to understand the experience of prevention-focused individuals in another way by including participants' evaluations of the choice options. From our perspective, when the risky option is the only one that can offer possible return, prevention-focused individuals choose it because it is necessary. It is not because they suddenly embrace risk itself and eagerly seek risk as something that they like. Rather, it is just that the risky option is the only one that can serve their underlying motivation. Thus, we expected that prevention-focused individuals in the "risky only possible return" condition would not show greater liking for the risky option but instead would show decreased disliking for the risky option (cf. Cacioppo & Berntson, 1994).

Method

Participants and design. Sixty-one (81.7%) of the participants (34 women, 27 men) completed the full study. Participants were randomly assigned to one of three conditions (risky only possible return, both possible return, neither possible return) in a between-subjects design. Regulatory focus was calculated using the strength measure (Higgins et al., 1997) as in Studies 1–3. The "risky only possible return" and the "both possible return" conditions were identical to the conditions used in Study 3. In the "neither possible return" condition, participants were presented with two options, neither of which offered a possible return to the status quo ante. The conservative option offered a "75% chance of gaining $6 and a 25% chance of losing $10" (var. = 48) and the risky option offered a "90% chance of gaining $5 and a 10% chance of losing $20" (var. = 81).[3] Across the pairs of stock investment options, participants' subjective perceptions of the risk level of the stock option were consistent with the variance data: in the "risky only possible return" condition, $M_{risky} = 3.2$ ($SD = 0.98$), $M_{conservative} = 1.8$ ($SD = 0.99$), $t(61) = 8.44$, $p < .001$; in

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[3] In this condition, the expected value of the risky option (EV = 2.5) was unintentionally higher than the expected value of the conservative option (EV = 2). However, there was no significant main effect of choice. In other words, participants in the "neither possible return condition" were not more likely to choose the risky option than participants in the other conditions (i.e., risky only possible return; both possible return), $F(2, 59) = 1.09$, $p > .30$. Because there was no significant choice preference in this condition, this slight difference did not appear to have any major impact.

the "both possible return" condition, $M_{\text{risky}} = 3.8$ ($SD = 1.01$), $M_{\text{conservative}} = 2.60$ ($SD = 1.17$), $t(61) = 6.14$, $p < .001$; and in the "neither possible return" condition, $M_{\text{risky}} = 3.3$ ($SD = 0.93$), $M_{\text{conservative}} = 1.7$ ($SD = 1.03$), $t(61) = 9.95$, $p < .001$. Procedures were identical to the earlier studies, except that immediately after participants made the critical decision, they were asked four additional questions about how much they liked and disliked both the conservative and the risky options on a 7-point scale ranging from 1 (*not at all*) to 7 (*very*). These four questions were presented in random order.

Regulatory focus strength. Using the traditional analytic approach, we found that the mean prevention strength score was −72.52 ($SD = 5.35$, skewness = 1.19), and the mean promotion strength score was −73.18 ($SD = 4.62$, skewness = .928; $r = .91$; VIF = 5.58). Using the *z*-score approach (the mean is always at zero), we found that the correlation between prevention strength ($SD = 5.84$, skewness = −1.437) and promotion strength ($SD = 5.42$, skewness = −1.16) dropped to $r = .84$ (VIF = 3.48).

Results and Discussion

Choice. As predicted, there was a significant interaction between the choice manipulation (dummy coded; "risky only possible return" coded as −1, "both return" coded as 1) and prevention strength ($p_{\text{traditional}} = .03$, $p_{\text{z-score}} = .007$). We conducted three separate logistic regressions to examine how prevention strength predicted preference for the risky option within each condition. In all regression analyses, standardized promotion and prevention strength scores were entered simultaneously. We replicated Study 3 in the "risky only possible return" and "both possible return" conditions. In the "risky only possible return" condition, prevention-focused participants were more likely to choose the risky option ($OR_{\text{traditional}} = 19.81$, $p_{\text{traditional}} = .06$; $OR_{\text{z-score}} = 81.54$, $p_{\text{z-score}} = .06$). We did not observe a significant main effect related to the strength of promotion orientation. In contrast, in the "both possible return" condition, prevention-focused participants were more likely to choose the conservative option ($OR_{\text{traditional}} = 0.001$, $p_{\text{traditional}} = .03$; $OR_{\text{z-score}} = 0.001$, $p_{\text{z-score}} < .01$). Individuals with high prevention strength had an 81% chance of choosing the riskier stock in the "risky only possible return" condition, whereas this percentage dropped to 21% in the "both possible return" condition. As in Study 3, prevention-focused people switched from choosing the risky option when only the risky option could get them back to the break-even point to choosing the conservative option when both options could get them back to the break-even point (see Figure 4). We also observed in this study (but not in Study 3) that high promotion strength increased the likelihood of choosing the risky option in this "both possible return" condition ($OR_{\text{traditional}} = 61.07$, $p_{\text{traditional}} = .04$, $OR_{\text{z-score}} = 369.33$, $p_{\text{z-score}} < .03$).

It is important to note that in the "neither possible return" condition, there was, as predicted, no significant association between prevention focus and the stock preference ($OR_{\text{traditional}} = 17.06$, $p_{\text{traditional}} = .09$; $OR_{\text{z-score}} = 9.11$, $p_{\text{z-score}} = .26$; see Figure 4). Although individuals high in prevention strength were somewhat more likely to choose the risky option (76%) than were those low in prevention strength (59%), this difference was not significant. Furthermore, the mean prevention strength of individuals who chose the risky option was not significantly different from the

mean prevention strength of individuals who chose the conservative option, $F(1, 16) = .21$, *ns*. We also did not observe a significant main effect related to the strength of promotion orientation.

Evaluation of options. For each return condition, we then conducted four linear regressions to test whether regulatory focus orientations predicted liking or disliking of the conservative or risky options. Two sets of significant results emerged. First, in the "risky only possible return" condition, prevention strength predicted a lower level of disliking of the risky option, standardized $\beta = -.92$, $t(20) = -1.96$, $p < .05$, for *z*-score result, $\beta = -.78$, $t(20) = -2.75$, $p < .01$. In other words, rather than liking for the conservative option increasing as strength of prevention focus increased, disliking for the risky option decreased (traditional analysis for disliking of risky option: $M_{\text{high prevention}} = 3.1$, $SD = 0.45$; $M_{\text{low prevention}} = 4.2$, $SD = 0.67$; *z*-score analysis: $M_{\text{high prevention}} = 3.3$, $SD = 0.41$; $M_{\text{low prevention}} = 4.3$, $SD = 0.45$). Prevention strength was not significantly associated with liking of the risky option, nor with either liking or disliking of the conservative option.

Second, in the "both possible return" condition, there was some evidence that prevention strength predicted both increased liking for the conservative option—$\beta = .94$, $t(20) = 2.62$, $p < .02$, $M_{\text{high prevention}} = 4.2$, $SD = 0.85$; $M_{\text{low prevention}} = 3.6$, $SD = 0.61$; for *z*-score result, $\beta = .43$, $t(20) = 1.15$, $p < .16$—and increased disliking of the risky option—$\beta = .72$, $t(20) = 2.21$, $p < .04$, $M_{\text{high prevention}} = 3.1$, $SD = 0.25$; $M_{\text{low prevention}} = 4.4$, $SD = 0.66$; for *z*-score result, $\beta = -.17$, $t(20) = -0.49$, $p < .64$. No significant effects emerged in the "neither possible return" condition. There was no relation in any of the return conditions between promotion strength and liking or disliking for the conservative and risky options.

This study provides additional support for the notion that it is the underlying motivation to return to the status quo ante that drives risky choice under loss. We replicated the pattern of results observed in Studies 1–3 and found further that when neither option could eliminate loss, prevention motivation was unrelated to choice. This suggests that the tactical level of choice operates in service of the underlying motivation. When none of the tactics serves the underlying motivation, the system no longer has a tactical preference. This finding in particular extends earlier conceptualizations of regulatory focus theory that have tended to assume that, all else being equal, individuals in a prevention focus will prefer a conservative option (Crowe & Higgins, 1997). It is now clear that preference for a conservative option occurs only when it can support the underlying vigilant strategy that serves prevention concerns. Unlike for neutral or positive situations, this default assumption cannot be made for situations of loss.

This study identifies at least one condition in which prevention motivation does not clearly predict choice under loss: when neither the risky nor the conservative option can restore the status quo. Furthermore, this study clearly differentiates our motivational approach from approaches that place the emphasis on the relative riskiness of the options without regard to what motives those options serve. It is not the option's risky or conservative level per se that drives individuals' choices but what an option means in relation to an individual's motives under loss.

This study also provides some very preliminary insight into the experience of prevention-focused individuals when confronting
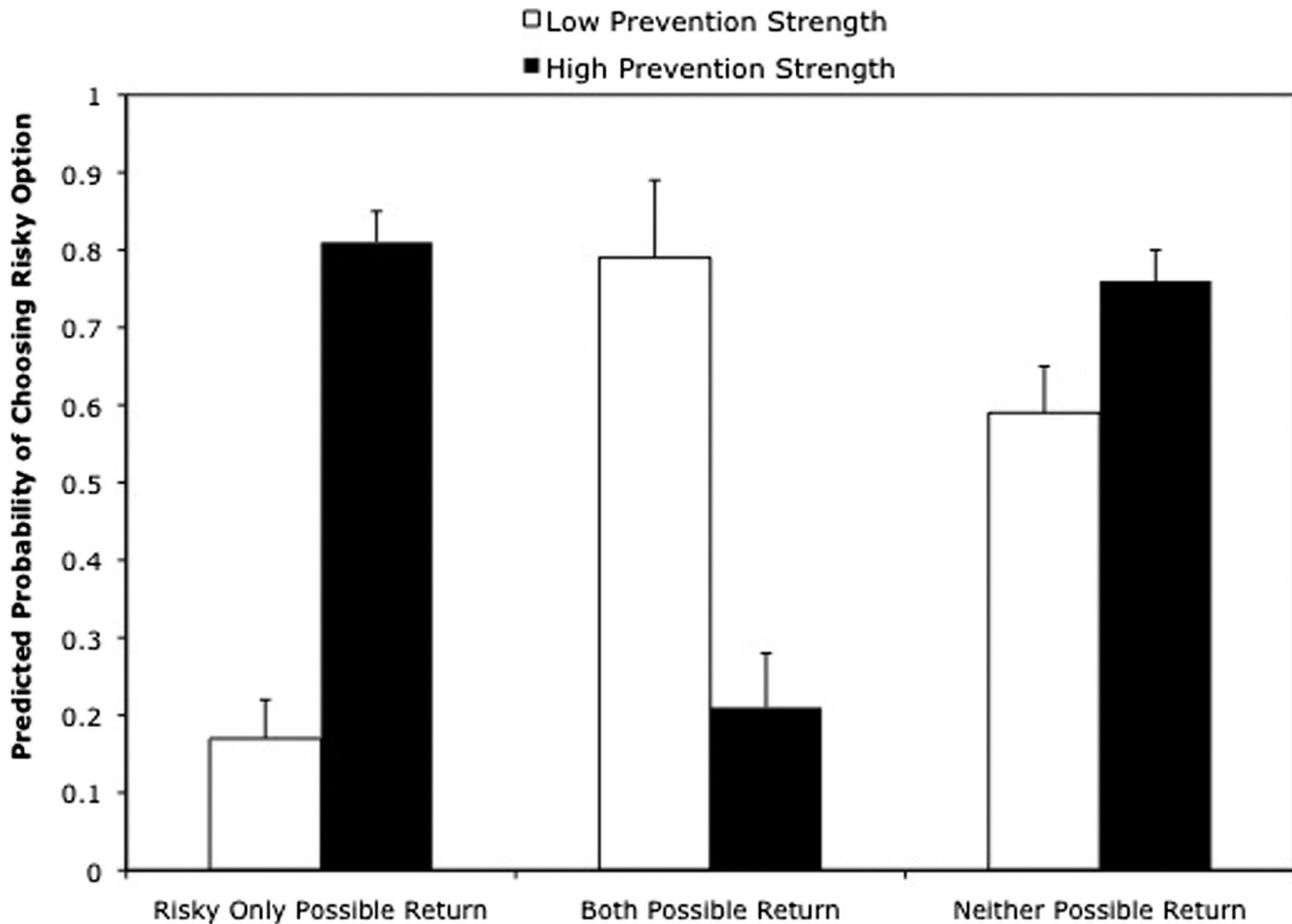
Figure 4. Predicted probability of individuals high and low in prevention strength (as determined by median split) choosing the risky option as a function of option type (risky only possible return, both possible return, neither possible return; Study 4). Error bars represent one standard error.

choice under loss. When the risky option was the only one that offered possible return, increased prevention strength did not predict increased liking of that option, but instead predicted decreased disliking of the risky option (cf. Cacioppo & Berntson, 1994). Although these results are exploratory, we believe that this is important for understanding the motivational nature of this risky choice. Risk seeking in this condition is not about feeling eager or liking risk; it is about necessity. It would be interesting to explore in future studies the meaning of risk seeking given different conditions and different motivational concerns. The same tactic, driven by different motivational concerns, may actually be quite different as a psychological experience.

General Discussion

The present research contributes both to our understanding of motivational factors in decision making under loss and to knowledge regarding regulatory focus theory. These studies demonstrate that fundamental self-regulatory concerns play an important role in accounting for risky decisions under loss. Across all four studies, we showed that the prevention motivational system, but not the promotion motivational system, consistently predicted the extent

of risky decision making below the break-even point. Moreover, individuals in a prevention-focused motivational state—whether that state was a chronic disposition or was situationally induced—exhibited both risk seeking and risk aversion, depending on the potential of the options available to serve the underlying motivational needs (Studies 3 and 4). If the risky option offered the only potential way to return to the previous status quo, prevention motivation predicted risk seeking. However, if a conservative option was available that also had the potential to get back to the status quo ante, prevention motivation predicted risk aversion. It is important to note that these effects were obtained with risky and conservative options that differed both in an objective characteristic of risk (variance) and in subjective perceptions of risk. Risk-seeking or risk-averse behaviors appear to represent tactics used by individuals to serve an underlying motivation; the motivation is not for risk itself but for tactics that can fulfill underlying strategic concerns (e.g., restoring safety). When no tactic was available to support the underlying strategic concern (i.e., neither the risky nor the conservative option allowed return to the status quo ante), prevention motivation was unrelated to choice (Study 4).

To examine the strength of relation between prevention motivation and risky choice under loss, we conducted a combined analysis across the three studies in which chronic regulatory focus was measured (Studies 1, 2, 4). We included the 96 participants in the loss conditions (down $9) across the three studies (excluding the 20 participants in the gain condition of Study 2 and the 20 participants in the condition in Study 4, in which neither option could bring them back to the break-even point). We coded the type of choice options such that the "risky only possible return" condition was coded 0 and the "both possible return" condition was coded 1. Study was also dummy coded and entered as a factor in the combined analysis. A logistic regression analysis yielded a significant interaction of prevention focus and type of choice option (OR = 1.69, p = .004; z-score OR = 1.89, p < .003). To better understand the interaction, we conducted logistic regression analyses within each condition. In the "risky only possible return" condition, prevention strength increased the odds of choosing the risky option (traditional score OR = 1.27, p < .03; z-score: OR = 1.49, p < .03). In the "both possible return" condition, prevention strength decreased the odds of choosing the risky option (traditional score OR = 0.76, p < .05; z-score OR = 0.69, p < .05).

This analysis did not show any significant effects for promotion focus. There were also no significant effects of Study in predicting choice or in moderating the effect of prevention focus (ps > .2). Although the current work was designed to explore the role of prevention motivation in understanding risky decision making under loss, it would be interesting to explore in the future when and how promotion motivation plays a role in predicting risky decision making.

Another question not directly addressed by the current studies is whether the magnitude of the loss (and, consequently, the magnitude of potential risk) matters for choice. Some empirical evidence (Harinck, Van Dijk, Van Beest, & Mersmann, 2007) suggests that the amounts of money used in our studies, although relatively small, may not have been experienced as minor by participants. Anecdotal evidence also suggests that even when big sums of money (e.g., millions of dollars) are involved, investors may take ever-increasing risks if they believe those risks offer the possibility of getting them back to the status quo ante (e.g., Clark & Jolly, 2008). That said, this is certainly an open question worthy of further study.

This research will also benefit from extension to non-status-quo reference points (cf. Heath, Larrick, & Wu, 1999; Larrick, Heath, & Wu, 2009) and nonfinancial losses (e.g., health losses). We speculate that what is fundamentally important about the psychology underlying the prevention effects in this article is that the reference point represents an elimination of loss. In that sense, what makes the reference point special is not its status quo-ness per se (i.e., the fact that it is a preexisting state) but its promise of nonloss and, thus, safety. Understanding under what conditions non-status-quo reference points in both financial and nonfinancial domains will show the same relations with prevention motivation will be an important question for future research (see also Brodscholl et al., 2007).

The Development of Prevention Motivation to Maintain the Status Quo

The current studies suggest that considering the role of regulatory focus motivation may help solve the puzzle of why both

risk-seeking and risk-averse behaviors have been observed in the domain of loss (Greenhalgh, 1983; March & Shapira, 1992; Roy, 1952; Schneider, 1992; Staw, 1976; Staw et al., 1981; Stone, 1973). When individuals are in a prevention-focused state, rather than a promotion-focused state, they are highly sensitive to differences among available options in their ability to serve the motivation to return to the status quo ante. Although it is not explored in the current article, it is interesting to think about how this differential sensitivity between promotion- and prevention-focused individuals arises.

Higgins (1991, 1998) suggested that different kinds of caretaker–child interactions shape children's sensitivity to the presence of gains versus the absence of losses. Although there are relatively few empirical studies of the impact of different developmental histories on regulatory system development (for exceptions, see Higgins & Silberman, 1998; Keller, 2008; Manian, Papadakis, Strauman, & Essex, 2006; Manian, Strauman, & Denney, 1998), there is consistent support for the idea that children of caretakers who adopt a more critical and punitive mode and who emphasize protection, safety, and responsibilities are more likely to become prevention-focused, including evidence that these children will later have a strong prevention focus as assessed by the strength measure used in the present studies. Such caretakers are highlighting the relative importance of the status quo as the boundary between what is safe or acceptable (i.e., what ought to be done) and what is not. When children maintain the status quo (i.e., behave in a safe and acceptable manner), then the interactions with their caretakers are calm and quiet (the absence of negatives), but when the children fall below the status quo, the interactions with their caretakers become tense and punitive (the presence of negatives). Thus, individuals who are chronically prevention focused may be socialized early in life to the importance of maintaining the status quo. Further investigation in the future of what conditions (both chronic and temporary) more generally produce an emphasis on maintaining the status quo would be very useful.

Implications for Other Models of Risky Decision Making

The self-regulatory approach that we embrace here suggests a conceptualization of risky decision making that we believe has the potential to extend and complement both "cold" and "hot" extant models of risky choice under loss. With regard to the most well-known "cold" model of risky choice, prospect theory (Kahneman & Tversky, 1979), the current approach highlights how the prevention and promotion motivational systems affect two aspects of the value function. The value function in prospect theory argues that people evaluate gains and losses relative to a neutral reference point. The current research suggests that the motivational significance of that neutral reference point differs depending on an individual's motivational state. Equally important, the current studies underscore that loss aversion is not equivalent across individuals and motivational states. Prevention-focused individuals find losses unacceptable in a way that promotion-focused individuals do not; consequently, prevention motivation, but not promotion motivation, will predict risky choice behavior for gambles that have the unique potential to get back to the status quo ante.

In this aspect, our approach also complements March and Shapira's (1987, 1992) dual reference-point model. They suggest that shifting attention between the break-even point (the *aspiration level*, in their language) and the survival point predicts whether individuals will be risk seeking or risk averse. According to their model, this attentional focus may shift depending on an individual's distance from a given reference point or depending on prior success or failure experiences. Furthermore, when individuals are below the break-even point and attending to it, the model predicts risk seeking. However, our model suggests that even if individuals are relatively close to the break-even point and are attending to it, it is important to also know something about an individual's motivation state to account for choice.

Our approach also complements models that have proposed that individuals are motivated to make regret-minimizing choices (Bell, 1982, 1983; Josephs et al., 1992; Larrick, 1993; Loomes & Sugden, 1982, 1987). This approach has been able to account for patterns of decision making in the domain of gains but has not been able to parsimoniously account for risky decision making in the domain of losses. In the domain of loss, what is the regret-minimizing choice? The present work suggests that the answer to that question may depend on whether an individual is in a prevention or promotion-focused state. Different motivational orientations impact the meaning of the status quo and the meaning of progress itself; what counts as a "competent" or "incompetent" decision hinges on those very perceptions (cf. Roese, Hur, & Pennington, 1999). A comprehensive motivational approach to risky decision making needs to account for the different strategic ways in which individuals can approach success and avoid failure and the ways in which these strategic orientations dictate the very meaning of what "progress," "success," or "loss" denotes.

Although motivation has always been part of social psychological theorizing, many accounts of the psychological processes involved in risky decision making have focused on "hot," affective mechanisms rather than motivational principles per se (Bell, 1985; Isen & Gevan, 1987; Isen & Patrick, 1983; Leith & Baumeister, 1996; Loewenstein, Weber, Hsee, & Welch, 2001; Loomes & Sugden, 1982, 1987; Mellers, Schwartz, Ho, & Ritov, 1997; Nygren, Isen, Taylor, & Dulin, 1996; Peters & Slovic, 1996; Slovic, Flynn, & Layman, 1991). Our approach emphasizes the importance of considering strategic motivational inclinations, and the tactics that support them, for understanding risky choice. In particular, the findings of Study 2, in which prevention motivation predicted risky choice controlling for affect, suggest that the proposed motivational underpinnings cannot be reduced to affective reactions.

Although it is not directly tested in the current studies, our results also suggest the possibility that different manifestations of risk seeking may have different motivational sources. Risk seeking by prevention-focused individuals in the domain of losses appears to serve the motivation to return to the previous status quo (i.e., restore safety). However, what motivation is served by risk-seeking in the domain of gains? And how might risk seeking in the domain of gains be related to promotion system concerns? To the extent that risk seeking may be motivated either by vigilance or eagerness, depending on the current state (above or below the status quo) and motivational orientation (promotion or prevention), we believe there is much left to be explored in understanding what motivates risk seeking, and even what risk seeking means, for individuals under different circumstances.

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