The Role of Hope in Financial Risk Seeking

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One construct validation study and four experiments showed that the relationship between hope and financial risk seeking depended on whether or not the possibility of a hoped-for outcome was threatened. Whereas high (vs. low) hope decreased financial risk seeking when the possibility of a hoped-for outcome was not threatened, high (vs. low) hope increased financial risk seeking when the outcome's possibility was threatened. These effects were observed in different contexts (i.e., gambling, stock investing, bidding, retirement investing), when applying different operationalizations of hope and threats to possibility, and when controlling for alternative explanations. We also showed that individuals' motivations to either achieve gains or avoid losses mediated the effects of hope on financial risk seeking. This research, which is the first to study the role of hope in financial decision making, adds to the extant literature by underscoring the psychological impact of threats to the possibility of attaining a hoped-for financial outcome.

Keywords: hope, outcome threat, financial risk seeking, experiments

Supplemental materials: http://dx.doi.org/10.1037/xap0000027.supp

John, a colleague of one of the authors, is a keen participant in a fantasy basketball league, whose participants own, manage, and coach imaginary teams based on statistics generated by actual basketball players and teams. The fantasy league winner gets a big cash prize; last year, John won $800. John went into this season with a strong hope to win again. An important theoretical question is how John's strong hope to win affects his decision making in the league. Specifically, will it influence him to be more or less risk seeking? When the season started, John was very conservative in his financial decisions related to his fantasy team (e.g., purchasing or trading players). His strong hope of winning made him careful to avoid taking excessive financial risks. However, as the playoffs drew to a close, he found himself on a losing streak, at the bottom of the league rankings. Seeing the possibility of achieving the hoped-for win threatened, John threw caution to the wind and started making risky player purchases and trades. Based on this anecdotal evidence, it seems that hope might sometimes reduce and sometimes enhance financial risk seeking. To date, however, there is no empirical evidence that clarifies the relationship between hope and financial risk seeking.

Over the last few decades, and increasingly so in recent years, the construct of hope has received attention from scholars in numerous fields, including psychology (Averill, Catlin, & Chon, 1990; Blanchette, Richards, Melnyk, & Lavda, 2007; Snyder, 1994), sociology (Desroche, 1979), marketing (MacInnis & De Mello, 2005; Winterich & Haws, 2011), medicine (Taylor, 2000), and theology (Moltmann, 1965). Hope is defined as the degree to which one yearns for an uncertain (but possible) goal-congruent outcome, such as being accepted into the college of one's choice, getting hired, making money, losing weight, having children, seeking medical treatments, or, as the opening vignette illustrates, winning in a fantasy basketball league (Averill et al., 1990; MacInnis & De Mello, 2005). The emotion of hope has considerable relevance to the understanding of a wide range of human motivations and decisions, because choices are often guided by hoped-for future outcomes (e.g., De Mello, MacInnis, & Stewart, 2007; MacInnis & De Mello, 2005).

An interesting yet understudied issue is whether (and how) hope impacts risk seeking. Although hope is relevant to myriad life domains, we examined its effects on risk seeking specifically in the context of financial decisions such as gambling, stock investing, bidding, and retirement investing. Studying the role of hope in the financial risk-seeking context is timely, as the recent financial crisis has drastically increased the need for a better understanding of individuals' financial decision making in order to improve both financial and psychological well-being (Lynch, 2011). Indeed,

saving money, investing in stocks, and contributing to a retirement plan can largely determine not only one's financial security but also one's psychological well-being (e.g., McKee-Ryan, Song, Wanberg, & Kinicki, 2005). Interestingly, right after the shock of the financial crisis, individuals' saving rates spiked. Shortly thereafter, however, low saving rates, overextensions of credit, and failures to adequately plan for the financial future returned to their ubiquitous precrisis levels ("Saving," 2013). What are some psychological reasons for this phenomenon? This research aimed to provide some answers.

We propose that whether high (vs. low) levels of hope enhance or reduce financial risk seeking depends on whether or not the hoped-for outcome is threatened. Outcomes are threatened when information or an event shakes individuals' confidence about whether a hoped-for outcome will occur (De Mello, et al., 2007). According to our research, in the absence of outcome threat, high (vs. low) hope lowered financial risk seeking because it induced a motivation to avoid losses. In contrast, in the presence of outcome threat, high (vs. low) hope increased financial risk seeking because it induced a motivation to achieve gains. In this article, we demonstrated these effects while controlling for various emotional states (e.g., mood, fear, optimism) and personality traits (e.g., trait risk aversion).

Our findings contribute to the recent literature on the risk-seeking implications of emotions. Whereas past research has compared the differential effects of negative emotions on risky decision making (Fischhoff, Gonzalez, Lerner, & Small, 2005; Lerner & Keltner, 2000; Raghunathan & Pham, 1999), little research has examined the risk-seeking implications of positive emotions such as hope. Our findings also contribute to the applied literatures on consumer finance and economic psychology, two fields typically dominated by cognitively focused (vs. emotionally focused) conceptual frameworks (for exceptions see Cryder, Lerner, Gross, & Dahl, 2008; Lerner, Small, & Loewenstein, 2004).

In this article, we articulate our ideas more fully, define core constructs, differentiate the hope construct from related ones, and develop our research hypotheses. Study 1 demonstrated that the hope construct was empirically differentiated from conceptually related constructs. Studies 2 to 5 tested our hypotheses. Each study used a different sample and a different operationalization, and each controlled for alternative explanations.

Conceptual Background

What Is Hope?

Consistent with past research, we define hope as a positive emotion that reflects the extent to which one yearns for a possible (if uncertain) goal-congruent outcome (Averill et al., 1990; Frijda, Kuipers, & Ter Schure, 1989; MacInnis & De Mello, 2005; Roseman, 1991; Rycroft, 1979; Smith & Ellsworth, 1985). Thus, the outcome for which one yearns is positive (goal-congruent) and its occurrence is not yet known; that is, it is possible for it to occur, but there is uncertainty regarding whether it actually will occur. For example, the statement, "I really hope I win the lottery" expresses that the individual has a strong yearning or desire to win and believes that winning is possible, even if he or she is uncertain about whether or not he or she will indeed win.

Hope varies as a function of the degree of yearning or desire for a possible goal-congruent future outcome (De Mello & MacInnis, 2005; MacInnis & De Mello, 2005). For example, although two individuals may both hope to lose weight, they may differ in the extent of that hope; that is, one may yearn more for this outcome than the other. Thus, the degree of hope can be characterized as existing on a continuum from low to high, with higher levels indicating greater yearning for a goal-congruent possible future outcome.

Our definition of hope, although similar to other researchers' definitions, is distinct from the construct of hope as defined by Snyder et al. (1991), who defined hope as "a cognitive set that is based on a reciprocally derived sense of successful (a) agency (goal-directed determination) and (b) pathways (planning of ways to meet goals)" (Snyder et al., 1991, p. 571). Snyder et al.'s definition of hope shares some conceptual similarities with ours, as it emphasizes positive, if uncertain, goal-congruent outcomes. However, whereas our usage focuses on the degree to which individuals *yearn* for this outcome, Snyder's work focused on the thought processes individuals might undergo to help them *actualize* the outcome through agency and pathways thinking. Specifically, as individuals think through more pathways to achieve desired outcomes and develop agency beliefs, they become more hopeful that the outcome will occur. In this way, whereas hope reflects the degree of yearning for a goal congruent outcome, hopefulness reflects not the degree of yearning for the outcome, but a generalized belief that one can make it happen.

Hope Versus Other State Variables

We proposed that hope is also different from other, seemingly related state variables such as general mood states, optimism, and fear. Because these state variables can also act as possible drivers of financial risk seeking, we controlled for them in the studies described in this paper.

Hope versus mood. As a positive emotion, hope is distinct from positive mood. Although hope might induce a positive mood, hope is a specific emotional (vs. generalized) affective state that goes beyond valence to include other appraisal dimensions such as certainty and desirability (e.g., Reimann et al., 2012). Moreover, whereas mood references the present, hope references a future outcome.

Hope versus optimism. As defined, our use of hope is also distinct from state optimism, which is understood as the degree to which one expects that a good outcome will (vs. will not) occur (Scheier, Carver, & Bridges, 1994). The more one believes that a good outcome will occur (or that a bad outcome will not), the more optimistic one becomes. Conversely, the more one believes that a good outcome will not occur (or that a bad outcome will), the more pessimistic one becomes. Thus, optimism varies as a function of one's *expectation* for a given outcome, whereas hope varies as a function of the *degree of yearning* for that outcome. Optimism has also been defined as a trait related to the generalized expectation that outcomes are more likely to be positive than negative (Scheier & Carver, 1985). Thus, whereas hope reflects yearning for an uncertain future outcome, this perspective on optimism reflects an outcome's valence; that is, the idea that the uncertain future outcome is more likely to be good than bad (Scheier & Carver, 1985). Moreover, whereas hope references a specific outcome

("I hope I win the lottery"), this usage of optimism reflects generalized beliefs about the future ("In general, I think things will go well for me").

Hope versus fear. Fear is a negative emotion that reflects the degree to which one dreads (vs. yearns for) a possible (if uncertain) goal-incongruent outcome. As such, fear can be considered the opposite of hope. Notably, though, because both hope and fear reflect future outcomes whose occurrence is unknown, it is possible that individuals can feel hope and fear in reference to the same outcome. Thus, whereas one might hope to make money on the stock market, one might also fear losing money in the same endeavor.

Prior Work on Hope

Several researchers have noted that empirical work on how hope impacts decision making is extremely limited (Cohen, 1958; Lazarus, 1999). Some work has studied the impact of hope on motivated reasoning behavior (De Mello & MacInnis, 2005; De Mello, et al., 2007), whereas other research has focused on the effects of hope on judgments (Pham & Avnet, 2004). To date, however, no studies have empirically examined how hope impacts (financial) risk seeking. This omission is significant, because risk-related decisions are, by definition, made under conditions of uncertainty, when future-oriented emotions like hope are likely to occur.

Prior Work on the Role of Emotions in Risk Seeking

Some prior research has examined the impact of general affective states (such as mood) on risk perceptions and/or risky behaviors. Research on mood has found that individuals in a positive mood tend to perceive less risk and make more risk-seeking choices than do control subjects or those in a negative mood (e.g., Haase & Silbereisen, 2011; Isen & Patrick, 1983; Johnson & Tversky, 1983). This would suggest that higher levels of hope should enhance risk seeking, because hope induces a more positive mood.

Other work has focused on negative emotions like anger and fear and their effects on risk seeking. Such studies have shown that anger is associated with more risk seeking, whereas fear is linked to less risk seeking (e.g., Leith & Baumeister, 1996; Lerner, Gonzalez, Small, & Fischhoff, 2003; Lerner & Keltner, 2001; Maner & Gerend, 2007). This would also suggest that higher levels of hope might be associated with greater risk seeking, because hope can be considered the opposite of fear. However, we offer different predictions about the effect of hope on risk related decision making, as described below.

Hypotheses

Hope and Outcome Threat

Hope references a future outcome that, although uncertain, is viewed as possible and about which individuals hold beliefs with a certain degree of confidence. However, new environmental conditions or information may threaten individuals' confidence that the hoped-for outcome will indeed occur. For example, a consumer may hope to attain a financially secure retirement; however,

changes in the environment (e.g., an economic recession) may weaken his or her confidence that this outcome will occur. We use the term "outcome threat" to describe situations in which confidence that the hoped-for outcome will occur is shaken. Therefore, outcome threat is a subjective state, referring to a change in one's subjective assessments of an outcome's occurrence. Many decision-making contexts (e.g., gambling, investing, medical decision making) involve situations in which new or changing information threatens one's confidence in the hoped-for outcome's occurrence. Hence, we believe that outcome threat is a relevant construct for understanding risk-related behaviors.

Impact of Hope on Financial Risk Seeking When Outcome Threat Is Absent

We predicted that when external information does not threaten individuals' confidence in a goal-congruent outcome's occurrence, greater levels of hope would be associated with *decreased* financial risk seeking. Specifically, we anticipated that as hope increases, individuals would be more likely to consider a range of possible future outcomes related to both the occurrence of the hoped-for outcome (goal success) and its nonoccurrence (goal failure). For example, in financial decision making, hope may activate thoughts about not only the prospect of achieving positive financial gains but also the prospect of no gain or even of financial loss. Thus, we believed that the more individuals hope for a positive financial outcome, the less risk seeking they would be, so as to maximize the likelihood of at least *some* financial gain. In other words, we expected that hope would foster a motivation to avoid or mitigate potential losses through less financial risk seeking (e.g., choosing safer investments or avoiding gambles in a game of chance).

Some prior research supports the notion that hope induces cautious behavior. De Mello et al. (2007) found that when students who hoped to do well on their midterms read an abstract from a scientific journal that indicated that stress was unrelated to brain performance, they engaged in more careful and objective information processing of information; they were more skeptical about product claims, discriminated better between strong and weak arguments, and incorporated nonsupportive claims into product evaluations. Although neither risk perceptions nor decision-making behaviors were studied in this particular research, the participants' skepticism and careful processing in these studies might have motivated the participants to avoid losses and made them less risk-seeking. Thus, we hypothesized the following:

> *Hypothesis 1 (H1):* When the possibility of the goal-congruent outcome is not threatened, (a) increases in hope would be associated with decreased financial risk seeking and (b) the relationship between hope and financial risk seeking would be mediated by motivations to avoid losses.

Impact of Hope on Financial Risk Seeking When Outcome Threat Is Present

We postulated that, under conditions of outcome threat, greater levels of hope would be associated with *increased* financial risk seeking. One reason for this argument is that high levels of hope might incline individuals to avoid focusing on the downside of

their risk-seeking behavior (e.g., the fact that they might not win). Consistent with this logic, De Mello et al. (2007) found that, to cope with outcome threat, individuals tended to engage in motivated reasoning, perhaps to restore confidence that the outcome for which they hope is indeed possible. Specifically, when the goal-congruent outcome was threatened, individuals placed less weight on negative information, formed more self-serving conclusions, and discounted negative information at odds with these conclusions. Such a focus might prompt individuals to choose a riskier option. As such, we expected that, in situations in which confidence in the hoped-for outcome is threatened, individuals would become more financially risk seeking in their eagerness to restore their confidence. Under such outcome threat, these individuals would not be motivated to avoid loss but rather would be motivated to achieve gains, leading to more financial risk seeking (e.g., choosing risky stocks for their portfolios or choosing gambles over certainties in games of chance). Thus, we hypothesized the following:

Hypothesis 2 (H2): When the possibility of the goal-congruent outcome is threatened, (a) increases in hope would be associated with increased financial risk seeking, and (b) the relationship between hope and financial risk seeking would be mediated by motivations to achieve gains.

Overview of Studies

This research reports five studies. Study 1 was a construct validation study that aimed to distinguish hope from the seemingly related yet conceptually distinct constructs described earlier. Studies 2 through 5 aimed to provide convergent empirical evidence for H1 and H2. The studies used different manipulations (Studies 2, 3, 4) and measures of hope (Studies 1 and 5), as well as different ecological contexts. The presented set of studies provided nomological validity by differentiating hope from other constructs (Study 1) and external validity by generalizing the phenomenon across multiple contexts (Studies 1 through 5). Finally, it is important to note that in Studies 2 through 5, we used a "low hope" condition as the baseline/control condition. A condition of "zero hope" (in the sense of a "neutral" or "blank" control condition) would not exist, because hope is a context-specific emotional state, such that making goal-congruent decisions involves some level of hope by definition (MacInnis & De Mello, 2005).

Study 1: Hoping for an *American Idol* Finalist to Win

Overview and Methods

Earlier, we argued that hope is conceptually distinct from mood, state optimism, trait optimism, and state fear. Study 1 aimed to provide empirical support for this argument by examining hope's discriminant validity from these related constructs. In addition, we included trait risk aversion, as this construct is relevant to the financial decision making context we studied. Following recommended validity testing procedures (Homburg, Klarmann, Reimann, & Schilke, 2012; Netemeyer, Bearden, & Sharma, 2003; Nunnally, 1967), we used confirmatory factor analysis (CFA) to assess the discriminant and nomological validity of the hope construct. CFA allowed us both to distinguish hope from other

constructs and to test its role in a broader network of constructs (Brown, 2012; Iacobucci, 2009). Constructs in this study were indicated using the measures and response scales shown in Table 1. The popular reality TV show *American Idol* served as the context.

One hundred fifteen viewers of *American Idol* (47% female, M_{age} = 32 years) were recruited via Amazon's mTurk marketplace in exchange for monetary compensation. The study was conducted 3 weeks before the *American Idol* Season 12 finale, which featured the three singing contestants who then remained in the running (Angie Miller, Kree Harrison, and Candice Glover). We first measured participants' mood states (Watson & Clark, 1999). Next, we measured participants' hope that one of the three *American Idol* finalists would win the contest, using two items: "I really hope that [finalist's name] will win *American Idol* this year" and "I have a strong desire to see [finalist's name] win *American Idol* this year." We then assessed their state fear and state optimism regarding one of the three finalists winning. Trait optimism (Scheier et al., 1994) and trait risk aversion (Donthu & Gilliland, 1996) were measured last. All measures and their reliabilities are reported in Table 1. Because there were no differences in responses across the three finalists, we collapsed the data and analyzed them across all three finalists.

Results

The CFA measurement model was specified such that each item indicated its respective construct. The CFA measurement model fit the data satisfactorily, χ^2 (150) = 246.96, χ^2/df = 1.65, CFI = .94, TLI = .92, NFI = .86, SRMR = .07. Results revealed that all standardized item loadings were significantly greater than zero ($p \le .001$) and positive, providing evidence of convergent validity. To assess internal consistency and reliability of the measured constructs, we then computed Cronbach's alphas (αs) and composite reliabilities. For all constructs, except for trait risk aversion, these indices surpassed recommended values of .70, indicating good internal consistency and reliability (see Table 1; Netemeyer et al., 2003; Nunnally, 1967). In addition, we computed average variance extracted (AVE) estimates, which measure the amount of variance captured by a construct in relation to the amount of variance because of random measurement error (Fornell & Larcker, 1981). For all constructs, except for trait risk aversion, AVE estimates exceeded the recommended value of .50, which indicates that variance captured by the construct is larger than the variance because of measurement error (see Table 1; Fornell & Larcker, 1981). Together, these analyses indicated sufficient convergent validity and reliability of hope and the other measured constructs (except for trait risk aversion).

We assessed the discriminant validity of the hope measure in two ways. First, we followed the procedure outlined by Fornell and Larcker (1981), who state that a construct has sufficient discriminant validity if the variance the construct shares with its measurement items is larger than the variance that it shares with other constructs in the model. Accordingly, sufficient discriminant validity is indicated if the square root of the AVE estimates for each pair of constructs exceeds the correlation between the constructs (see Table 2). This was the case for all six comparisons, indicating discrimination between the hope and each respective related construct.

Table 1
Study 1: Measurement Items and Validity Assessment

Construct	Items	M	SD	α	CR	AVE
Hope (1 = *strongly disagree*; 7 = *strongly agree*)	Please indicate your level of agreement with the following questions about [*finalist's name*].			.96	.96	.92
	– I really hope that [*finalist's name*] will win "American Idol" this year.	4.75	2.20			
	– I have a strong desire to see [*finalist's name*] win "American Idol" this year.	4.62	2.28			
Positive mood (1 = *strongly disagree*; 7 = *strongly agree*)	First, please tell us how you are feeling at the present moment. To what extent do you disagree or agree that you are feeling each of the following emotions?			.73	.76	.63
	– Proud	3.94	1.65			
	– Happy	5.09	1.41			
Negative mood (1 = *strongly disagree*; 7 = *strongly agree*)	First, please tell us how you are feeling at the present moment. To what extent do you disagree or agree that you are feeling each of the following emotions?			.95	.95	.83
	– Sad	2.01	1.49			
	– Guilty	1.64	1.28			
	– Angry	1.63	1.24			
	– Afraid	1.65	1.36			
State optimism (1 = *strongly disagree*; 7 = *strongly agree*)	Please indicate your level of agreement with the following questions about [*finalist's name*].			n/a[a]	n/a[a]	n/a[a]
	– I am optimistic that [*finalist's name*] will be able to win "American Idol" this year.	4.43	1.93			
Trait optimism (1 = *strongly disagree*; 7 = *strongly agree*)	Please indicate your level of agreement or disagreement with each of the following statements.			.92	.92	.67
	– In uncertain times, I usually expect the best.	4.61	1.58			
	– If something can go wrong for me, it will.[b]	4.51	1.78			
	– I'm always optimistic about my future.	4.74	1.52			
	– I hardly ever expect things to go my way.[b]	4.65	1.76			
	– I rarely count on good things happening to me.[b]	4.63	1.86			
	– Overall, I expect more good things to happen to me than bad.	4.83	1.59			
State fear (1 = *strongly disagree*; 7 = *strongly agree*)	Please indicate your level of agreement with the following questions about [*finalist's name*].			.81	.82	.69
	– I have a strong fear that [*finalist's name*] will not be able to win "American Idol" this year.	3.12	1.68			
	– Thinking about [*finalist's name*] winning "American Idol" this year makes me feel fearful that she might not be able to achieve this goal.	2.91	1.66			
Trait risk aversion (1 = *strongly disagree*; 7 = *strongly agree*)	Please indicate your level of agreement or disagreement with each of the following statements.			.62	.66	.41
	– I would rather be safe than sorry.	5.65	1.30			
	– I want to be sure before I purchase anything.	5.92	.98			
	– I avoid risky things.	5.09	1.55			

Note. CR = Composite Reliability; AVE = Average Variance Extracted; n/a = not applicable.
[a] α, CR, and AVE not available for single-item measures. [b] Reverse-coded.

Table 2
Study 1: Square Root of the Average Variance Extracted (AVE) Estimates for Each Pair of Constructs Exceed the Correlation Between the Constructs

Construct	1	2	3	4	5	6	7
Hope	**.96**						
Positive mood	.04	**.79**					
Negative mood	.19*	−.30**	**.91**				
State optimism	.69***	.14	.08	**n/a**			
Trait optimism	−.08	.48**	−.35**	.12	**.82**		
State fear	.23**	.00	.24*	−.03	−.07	**.83**	
Trait risk aversion	.14	.01	.01	.14	−.17	−.13	**.64**

Note. $N = 115$. Bold numbers on the diagonal show the square root of AVE; numbers below the diagonal show the correlations. AVE not available for single-item constructs; n/a = not applicable.
* $p \leq .1$. ** $p \leq .05$. *** $p \leq .01$.

Second, we conducted a series of pairwise chi-square difference tests, comparing each of the measured constructs to hope (Anderson & Gerbing, 1988). For each pair of constructs, we tested whether a two-factor model with unconstrained intercorrelation between hope and each related construct fits significantly better than a one-factor model (correlation constrained to 1). The two-factor models fit significantly better than the one-factor model in all cases (all $ps < .001$). Overall, our results demonstrated that the hope measure used in our studies possessed good discriminant validity.

Discussion

Study 1 found that participants' hope that their favorite finalist would win the *American Idol* contest was empirically distinct from their fear or optimism regarding this outcome. Hoping for the chosen finalist to win also differed from general affective states such as positive mood. Besides these state measures, Study 1 further showed that the hope construct was distinct from trait measures such as trait optimism and trait risk aversion. Combined, the results provided empirical support for the idea that hope is distinct from related constructs, and hence is a psychological state with potentially distinct significant effects on decision making. Next, Studies 2 through 5 aimed to demonstrate these effects by providing empirical support for H1 and H2.

Study 2: Wagering Money in the Final Round of *Jeopardy*

Overview and Methods

Participants. One hundred fifty-one adults (51% female, $M_{age} = 30$ years) from a major American consumer panel professionally managed by Qualtrics Labs participated in exchange for monetary compensation. We randomly assigned participants to one of four conditions in a 2 (hope: low vs. high) × 2 (outcome threat: absent vs. present) between-subjects experimental design, with hope and outcome threat as between-subjects independent variables and the amount of wagered money in the final round of the popular TV game show *Jeopardy* as the dependent variable. Participants were asked to imagine that they were contestants on

Jeopardy. They viewed pictures from the TV show and were told that they were in the final round of the game, with accumulated winnings of $10,000 from the correct responses they had previously provided. Participants were then randomly assigned to the hope and outcome threat conditions using the manipulations described below. Financial risk seeking was indicated by how much of their accumulated winnings participants were willing to bet in the final round of the game. A higher wager indicated greater financial risk seeking. Finally, participants completed a set of control variables, as described below, and reported the total amount of debt they currently owed.

Hope induction. The hope induction was designed to stimulate either high or low hope for the ability to pay off $20,000 in debt by varying the extent to which participants desired or yearned for this outcome. Participants' actual median debt was $13,000, making the $20,000 debt level fairly realistic. Participants in the high-hope condition were told that they had accumulated $20,000 in debt and that they really hoped to pay it off; that is, they had a strong yearning and desire to pay off this debt. High-hope participants were asked to focus on the strong desire to pay off their debt and to immerse themselves in the feeling of strong hope about repaying this debt. Participants in the low-hope condition were also told that they had accumulated $20,000 worth of debt but that they did not have a strong hope to pay it off; that is, they did not have a strong desire or yearning to repay this debt, because they would not have to pay monthly interest on it for another 12 months. Thus, participants in the low-hope condition were asked to focus on the fact that they did not have a strong desire to pay off this debt and to immerse themselves in the feeling of low hope about repaying this debt. To check the effectiveness of the hope induction, we asked two questions: "How much do you agree that you really hope to pay off your debt?" and "How much do you agree that you have a really strong desire to pay off your debt?" (1 = *strongly disagree*; 7 = *strongly agree*; Cronbach's $\alpha = .90$).

Outcome threat manipulation. Outcome threat was manipulated between subjects to alleviate the potential influence of demand characteristics (Rubin & Badea, 2010). Participants in the threat-absent condition were told that their salary for the next year would not change. Participants in the threat-present condition were told that they had received a major pay cut at work, which would make it very difficult for them to repay their debt. To check the effectiveness of the outcome threat manipulation, we asked the participants to respond to two items: "My confidence in my ability to pay off my debt was shaken after the information I received about my pay" and "I feel less confident that I will be able to pay off my debt after the information I received about my pay" (1 = *not at all*; 7 = *very much*; Cronbach's $\alpha = .96$).

Control variables. We controlled for several alternative variables, building on our results from Study 1. We measured trait optimism (Scheier et al., 1994) and trait risk aversion (Donthu & Gilliland, 1996) using the same measures as in Study 1. We measured participants' state fear about not being able to pay off their debt using two items: "I have a strong fear about not being able to repay my debt" and "Thinking about repaying my debt makes me feel fearful that I might not be able to achieve this goal" (1 = *strongly disagree*; 7 = *strongly agree*; Cronbach's $\alpha = .93$). We measured the participants' familiarity with *Jeopardy*, asking, "How familiar are you with the *Jeopardy* game show?" (1 = *not familiar at all*; 7 = *very familiar*).

Results

Manipulation checks. The hope induction was successful. As expected, participants in the high-hope condition reported significantly higher levels of hope ($M = 6.33$, $SD = 1.25$) than did participants in the low-hope condition ($M = 4.51$, $SD = 1.99$), $t(149) = 6.78$, independent samples, $p < .001$, 95% confidence interval (CI) of mean difference [1.29, 2.34], Cohen's $d = 1.10$, 95% CI around effect size [.85, 1.33]. There was no significant difference in the levels of hope between the outcome threat conditions ($p > .15$).

The outcome threat manipulation was also successful. As expected, participants in the threat-present condition reported significantly higher levels of outcome threat ($M = 4.91$, $SD = 1.54$) than did participants in the threat-absent condition ($M = 4.11$, $SD = 1.67$), $t(149) = 3.09$, independent samples, $p < .01$, 95% CI of mean difference [.29, 1.32], Cohen's $d = .50$, 95% CI around effect size [.27, .73]. There was no significant difference in the levels of outcome threat between the hope conditions ($p > .35$).

Interaction effect. An analysis of covariance used hope and outcome threat as between-subjects independent variables; trait optimism, trait risk aversion, state fear, and familiarity with *Jeopardy* as control variables; and the amount of wagered money as the dependent variable. The analysis revealed a significant interaction effect between hope and outcome threat on wagered money, $F(1, 140) = 10.90$, $p < .01$, effect size $r = .28$. In the threat-absent condition, participants in the high hope condition wagered less money ($M = \$2,759$, $SE = \$451$, 95% CI [$1,867, $3,651]) than did participants in the low-hope condition ($M = \$4,022$, $SE = \$453$, 95% CI [$3,127, $4,916]). This finding supports H1a. However, in the threat-present condition, participants in the high-hope condition wagered more money ($M = \$4,172$, $SE = \$405$, 95% CI [$3,372, $4,973]) than did participants in the low-hope condition ($M = \$2,521$, $SE = \$455$, 95% CI [$1,620, $3,421]). This finding supports H2a. Figure 1 illustrates the identified interaction effect.

Both the effect of hope on wagered money ($p > .65$) and the effect of outcome threat on wagered money were nonsignificant ($p > .90$). Of the control variables, only trait risk aversion had a

significant effect on wagered money, $F(1, 140) = 10.03$, $p < .05$, with higher trait risk aversion leading to lower wagers.

Discussion

Study 2 supported the hypothesized interaction effect of hope and threat to outcome possibility on financial risk seeking. When the possibility of the goal-congruent outcome was not threatened, higher levels of hope were associated with decreased financial risk seeking, supporting H1a. Likewise, when the possibility of the goal-congruent outcome was threatened, higher levels of hope were associated with increased financial risk seeking, supporting H2a. These results were also identified when controlling for alternative explanations such as state fear, trait optimism, and trait risk aversion.

Study 3: Allocating Money to Different Stock Investment Funds

Overview and Methods

Study 3 aimed to assess whether findings from Study 2 would be replicated in a different context and with a different manipulation of hope. Study 3 also provided a more rigorous test of H1a and H2a by manipulating outcome threat within subjects. The within-subjects manipulation allowed us to determine whether the same individual is both (a) less financially risk seeking when hope is high and the hoped-for outcome's possibility is not threatened, and (b) more financially risk seeking when hope is high and the outcome's possibility is threatened. We used a stock investment context to test our hypotheses.

Participants. Fifty-six adult undergraduate students (36% female, $M_{age} = 20$ years) at a large private university on the American East Coast participated in exchange for course credit. We randomly assigned participants to one of two conditions in a 2 (hope: low vs. high) $\times$ 2 (outcome threat: absent vs. present) mixed experimental design, with hope as a between-subjects independent variable, outcome threat as a within-subjects independent variable, and investment allocations to a risky investment fund as the dependent variable.

First, participants were randomly assigned to either the high- or the low-hope condition and were exposed to the hope manipulation described below. Participants were then asked to make investment allocation decisions at two points in time, using a risk-seeking measurement method established in the extant literature (He, Inman, & Mittal, 2008). Specifically, participants were given the choice of investing in one of two stock investment funds with varying levels of risk and return: the less risky Fund 1, with a 90% chance of generating a return of 10% and a 10% chance of incurring a loss of 10% (i.e., a negative return: −10%), or the more risky Fund 2, with a 50% chance of generating a return of 28% and a 50% chance of incurring a loss of 10% (i.e., a negative return: −10%).

Participants' investment allocations were observed both before and after the outcome threat manipulation, making outcome threat (absent vs. present) a within-subjects factor. The first investment trial, which corresponded with the outcome threat-absent condition, was administered after the hope manipulation. At that time, the two stock investment funds were presented in random order
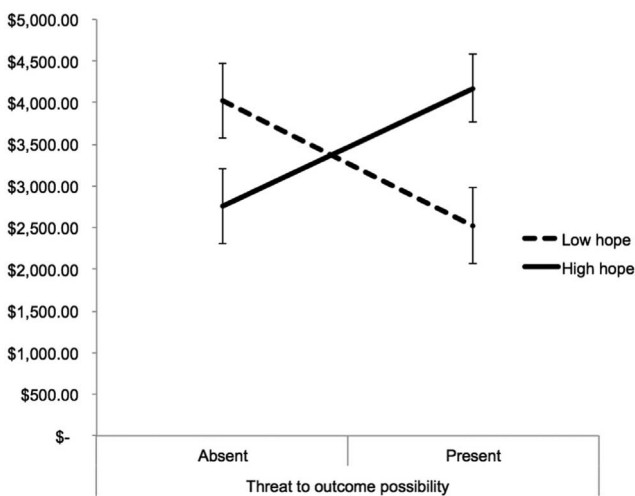
Figure 1. Study 2: Interaction effect between hope and absence or presence of threat to outcome possibility on wager amount (in $).

and participants were asked what percentage of their savings they would allocate to each fund. The second investment trial was administered after the outcome threat-present manipulation. At that time, the same two funds described were again presented in random order, and participants again indicated what percentage of their savings they would allocate to each fund. Participants then completed the control variables described below.

Based on our theorizing, we expected that in the first (threat-absent) investment trial, participants induced with high (vs. low) hope would be less financially risk seeking and thus would choose the less risky option (i.e., Fund 1) despite its slightly lower expected value. However, we predicted this pattern would reverse after participants received threatening information. Specifically, participants in the high-hope (vs. low-hope) condition were expected to become significantly more financially risk seeking and thus to increase their investment allocations to the riskier fund (i.e., Fund 2).

Hope induction.   By varying the extent to which participants desired or yearned for the ability to pay for graduate school tuition, the hope induction was designed to stimulate either high or low hope for this outcome. Participants in the low-hope condition were told that they were planning to attend graduate school in 2 years and that, although they had saved a sum of money, it was not yet enough to cover the tuition (He et al., 2008).

Participants in the high-hope condition were also told that they were planning to attend graduate school in 2 years and that the amount they had saved was insufficient to cover the tuition. Next, consistent with the definition of hope, which emphasizes the degree of desire or yearning for a given outcome, participants in the high-hope condition were further told that they really hoped that they would be able to save enough for graduate school tuition; that is, they strongly yearned to save enough money to enable them to advance their education by obtaining a graduate degree. Participations were asked to focus on their strong desire to save enough to attend graduate school, to immerse themselves in this feeling, and to describe their thoughts and feelings. Participants in the low-hope condition were asked to provide a detailed description of how they had spent the previous day.

To check the effectiveness of the hope induction, we asked participants to respond to the following two items twice (once before and once after the outcome threat manipulation): "I really hope to save enough money for graduate school" and "I have a strong desire to save enough money for graduate school" ($1 = $ *strongly agree*; $7 = $ *strongly disagree*; Cronbach's $\alpha_{before} = .93$; Cronbach's $\alpha_{after} = .86$).

Outcome threat manipulation.   Outcome threat was manipulated within subjects. Participants in the outcome threat-absent condition made their investment choices without receiving any information about past portfolio performance. In the outcome threat-present condition, participants were asked to imagine that, at the end of the first year, they had reviewed their investment performance and found that their investment had generated a 10% loss (i.e., a negative return: -10%) over the past year. They were then asked to make their investment choices. To check the effectiveness of the outcome threat manipulation, we asked the following question twice, once before and once after the outcome threat-present manipulation: "How confident are that you will be able to save enough money for graduate school?" ($1 = $ *not at all*; $7 = $ *very much*).

Control variables.   Trait optimism (Cronbach's $\alpha = .82$) and trait risk aversion (Cronbach's $\alpha = .61$) were measured as in Studies 1 and 2. Because they refer to personality traits, they were measured only once. We measured participants' state fear of not being able to save enough for graduate school using one item: "I have a strong fear about not being able to save enough money for graduate school" ($1 = $ *strongly disagree*; $7 = $ *strongly agree*).

Results

Manipulation checks.   The hope induction was successful. As expected, participants in the high-hope condition reported significantly higher levels of hope ($M = 7.17$, $SD = 1.68$) than did participants in the low-hope condition ($M = 5.78$, $SD = 2.75$), $t(54) = 2.31$, independent samples, $p < .05$, 95% CI of mean difference [.18, 2.61], Cohen's $d = .61$, 95% CI around effect size [.23, .98]. Because of the within-subjects design (i.e., because outcome possibility was threatened in the same sample of participants), there was a significant difference in the levels of hope between the threat-absent condition ($M = 6.50$, $SD = 2.35$) and the threat-present condition ($M = 5.75$, $SD = 1.10$), $t(55) = 2.33$, paired samples, $p < .05$, 95% CI of mean difference [.11, 1.40], Cohen's $d = .41$, 95% CI around effect size [.03, .78].

The outcome threat manipulation was also successful. As expected, participants reported significantly lower levels of confidence after the manipulation ($M = 4.67$, $SD = 1.13$) than before the manipulation ($M = 5.02$, $SD = 1.31$), $t(55) = 2.02$, $p < .05$, paired samples, 95% CI of mean difference [.00, .70], Cohen's $d = .29$, 95% CI around effect size [.09, .66]. There was no significant difference in the levels of outcome threat between the hope conditions either before the threat manipulation ($p > .35$) or after the threat manipulation ($p > .55$).

Interaction effect.   A repeated-measures analysis of covariance used hope as the between-subjects independent variable; outcome threat as the within-subjects independent variable; trait optimism, state fear, and trait risk aversion as covariates; and the investment allocations into a risky fund as the dependent variable. The analysis revealed a significant interaction effect between hope and outcome threat on investment allocations into a risky fund, $F(1, 51) = 6.78$, $p < .05$, effect size $r = .36$. Supporting H1a, in the absence of outcome threat, participants in the high-hope condition made fewer investment allocations into the risky fund ($M = 34\%$, $SE = 6\%$, 95% CI [22%, 46%]) than did participants in the low-hope condition ($M = 54\%$, $SE = 6\%$, 95% CI [42%, 66%]). On the other hand, in the presence of outcome threat, participants in the high-hope condition made more investment allocations into the risky fund ($M = 64\%$, $SE = 7\%$, 95% CI [51%, 78%]) than did participants in the low-hope condition ($M = 55\%$, $SE = 7\%$, 95% CI [41%, 69%]), supporting H2a. Figure 2 illustrates the identified interaction effect.

Although the main effect of hope on investment allocations into a risky fund was not significant ($p > .45$), the main effect of outcome threat on investment allocations into a risky fund was marginally significant, $F(1, 51) = 3.95$, $p = .05$. Of the control variables, only trait risk aversion had a significant effect on investment allocations into a risky fund, $F(1, 51) = 4.92$, $p < .05$, with higher trait risk aversion leading to lower investment allocations into a risky fund.
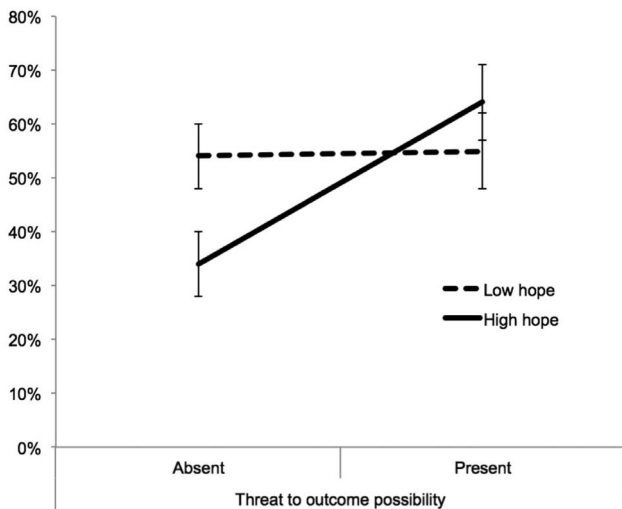
Figure 2. Study 3: Interaction effect between hope and absence or presence of threat to outcome possibility on investment allocations into risky fund (in %).

Discussion

Study 3 replicated Study 2, thus providing convergent empirical support for the hypothesized effects of hope on financial risk seeking in the presence or absence of outcome threat. Importantly, Study 3 replicated Study 2's results in a different context, utilizing different operationalizations of hope and outcome threat, and treating outcome threat as a within-subjects variable.

Study 4: Betting Money to Win a Storage Unit in *Storage Wars*

Overview and Methods

Study 4 had two objectives. First, it aimed to replicate results from Studies 2 and 3 in another context, so as to further enhance confidence in the generalizability of the results. Second, it aimed to provide a more direct and objective manipulation of hope with more realistic and incentive-compatible consequences for participants (i.e., ostensibly betting their own money). In line with Study 1, Study 4 included positive and negative mood, state optimism, trait optimism, state fear, and trait risk aversion as controls. We used a betting context to test our hypotheses.

Participants. One hundred fifteen adult undergraduate students (69% female, M_{age} = 22 years) at a large public university in the American West participated in an in-class version of the popular TV series *Storage Wars*. We randomly assigned participants to one of two conditions in a 2 (hope: low vs. high) × 2 (outcome threat: absent vs. present) mixed experimental design, with hope as the between-subjects independent variable, outcome threat as the within-subjects independent variable, and the betting amount in cents as the dependent variable.

First, we asked students if they would be interested in participating in an in-class betting session of *Storage Wars*, in which they would be connected to a bidding team. We also asked whether they had some cash on them to contribute a small percentage of the bets.

These questions made Study 4 incentive-compatible, as participants were ostensibly betting their own money. Two students declined to participate. Participants then reported their mood states using the same measure as in Study 1. Two factors emerged, one for positive mood (Cronbach's α = .73) and one for negative mood (Cronbach's α = .74). To confirm that participants believed that they were actually part of a *Storage Wars* session, we asked each of them to "Enter an e-mail address, so we can contact you to claim your profit if we win today." All but two of the participants stated an e-mail address, indicating that the believability of the study was high. Participants were then exposed to the hope and outcome threat manipulations, the latter of which was manipulated within subjects (as described below).

Hope induction. The hope manipulation was designed to induce either high hope or low hope of winning the bid for the storage locker by varying the extent to which participants desired or yearned for this outcome. Hope was manipulated between subjects. In both hope conditions, participants first were shown the following instructions through a projection on the classroom screen:

> Welcome to STORAGE WARS – LIVE BIDDING! Today, we ask you to help us bid on a storage locker. The auction for that locker will begin in a few minutes and you will be connected to us over the Internet and our smart phone. . . . Please wait . . . Please wait . . . Please wait . . . Please wait . . . Connected successfully! You are now connected to the bidding team . . . .

Next, participants in the low-hope condition read,

> Welcome! The storage unit is a 5′ × 5′ room, located in Northern Nevada, and we can see plastic bags with clothing in it, a mattress, and what seems to be a beat-up side table. This is all we can see from here. The auctioneer told us that he will start the auction at $5. There are 12 other bidders present today. The competition seems tough! We have a bidding partner on-site and she told us that she will increase our bids in $5 increments; every time we go up $5, you will bid 5 cents of your own money. Therefore, you are in with 1%. Of course, you will get your share of 1% of the profits, too, if we win the locker today. In the last storage locker we won, however, we found only trash.

Conversely, participants in the high-hope condition read,

> Welcome! The storage unit is a 5′ × 5′ room, located in Northern Nevada, and packed full with carton boxes, household items, and what seems to be a gray safety deposit box half hidden between the cartons. This is all we can see from here. The auctioneer told us that he will start the auction at $5. There are only 2 other bidders present today. The competition seems to be easy. We will increase our bids in $5 increments; every time we go up $5, you will bid 5 cents of your own money. Therefore, you are in with 1%. Of course, you will get your share of 1% of the profits, too, if we win the locker today. In the last storage locker we won, we found a piece of artwork, which we estimate to be worth at least $1,200. Great! Thus, you would have made a profit of $11 (1% of $1,200 = $12 minus your $1 bid = $11) for just a few minutes of your participation.

Next, to check the effectiveness of the hope induction, we asked participants to respond to the following two items: "I have a strong desire to win the storage locker" and "I really hope to win the storage locker" (1 = *strongly disagree*; 7 = *strongly agree*; Cronbach's α = .94).

Outcome threat manipulation. Outcome threat was manipulated within subjects. The following information was presented to all participants on a large screen as well as read aloud by the instructor:

> The FIRST ROUND of the auction will begin in 20 seconds . . . Please wait for the first bid . . . Remember, for every $5 we bid, you are in with 5 cents! Our bid: $5; Competitive bid: $0; Current bid: $5 – We lead! . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $5; Current bid: $15 . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $0; Current bid: $20 – We lead! . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $5; Current bid: $30 . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $0; Current bid: $35 – We lead! We can win this locker.

Participants were then asked to respond to the following two items to check the effectiveness of the outcome threat manipulation (here, outcome threat-absent): "After seeing the competitive bet, I feel less confident that I will be able to win the storage locker" and "My confidence in my ability to win the storage locker was shaken after seeing the competitive bet" (1 = *strongly disagree*; 7 = *strongly agree*; Cronbach's α = .65). Next, participants were asked to write down on a sheet of paper the amount of their money they would bid to complete this round of bidding. Specifically, participants were asked, "How much of your money would you give us now to complete this auction?" They were prompted to select either "None. I want to keep the money I have left" or "I want to bid money. I bid (in cents): ___."

When the second round of bidding started, the following text was presented:

> The SECOND ROUND of the auction will begin in 20 seconds . . . Please wait for the first bid . . . Remember, for every $5 we bid, you are in with 5 cents! Our bid: $5; Competitive bid: $0; Current bid: $40 . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $0; Current bid: $45 . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $5; Current bid: $55 . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $5; Current bid: $65 . . . Please wait for the next bid . . . Our bid: $5; Competitive bid: $75; Current bid: $145 – We are seriously behind.

Participants were then asked the following two questions to check the effectiveness of the outcome threat manipulation (here, outcome threat-present): "After seeing the competitive bet, I feel less confident that I will be able to win the storage locker" and "My confidence in my ability to win the storage locker was shaken after seeing the competitive bet" (1 = *strongly disagree*; 7 = *strongly agree*; Cronbach's α = .83). Next, participants were again asked to write down on a sheet of paper the amount of their money they would bid to complete this round of bidding.

Control variables. State optimism was measured by asking participants to rate their agreement with the following statement: "I am optimistic that I will be able to win the storage locker" (1 = *strongly disagree*; 7 = *strongly agree*). We measured participants' state fear about not being able to win the storage locker using two items: "I have a strong fear about not being able to win the storage locker" and "Thinking about being able to win the storage locker makes me feel fearful that I might not be able to achieve this goal" (1 = *strongly disagree*; 7 = *strongly agree*; Cronbach's α = .77). State fear and state optimism (as well as mood, as described previously) were measured before the bidding took place. Trait

optimism (Cronbach's α = .81) and trait risk aversion (Cronbach's α = .70) were measured as in Studies 1 and 2 and were recorded after the bidding. Participants were then debriefed. During the debriefing, participants were informed that their bids were not real and that they could keep their cash.

Results

Manipulation checks. The hope induction was successful. As expected, participants in the high-hope conditions reported significantly higher levels of hope (M = 3.46, SD = 1.83) than did participants in the low-hope condition (M = 2.75, SD = 1.48), $t(113) = 2.19$, independent samples, $p < .05$, 95% CI of mean difference [.07, 1.35], Cohen's $d = .43$, 95% CI around effect size [.16, .69].

The outcome threat manipulation was also successful. As expected, participants reported significantly higher levels of outcome threat after the manipulation (M = 5.34, SD = 1.57) than before the manipulation (M = 2.41, SD = 1.37), $t(112) = 14.78$, $p < .001$, paired samples, 95% CI of mean difference [2.54, 3.33], Cohen's $d = 1.99$, 95% CI around effect size [1.66, 2.30]. There was no significant difference in the levels of outcome threat between the hope conditions either before the threat manipulation ($p > .15$) or after the threat manipulation ($p > .15$).

Interaction effect. Inspection of boxplots revealed several outliers that inflated the standard deviation of the betting amount, both before and after the outcome threat manipulation. We addressed this issue by transforming extreme outlier values (i.e., those that were more than three interquartile ranges from the rest of the scores) to the next lowest nonoutlier value (Grubbs, 1969).

A repeated-measures analysis of covariance used hope as the between-subjects independent variable; outcome threat as the within-subjects independent variable; positive mood, negative mood, state optimism, trait optimism, state fear, and trait risk aversion as control variables; and the betting amount in cents as the dependent variable. The analysis revealed a significant interaction effect between hope and outcome threat on the change in investment allocations, $F(1, 103) = 4.40$, $p < .05$, effect size $r = .21$. Supporting H1a, in the absence of outcome threat, participants in the high-hope condition made smaller bets (M = 15 cents, SE = 5 cents, 95% CI [6 cents, 25 cents]) than did participants in the low-hope condition (M = 29 cents, SE = 6 cents, 95% CI [17 cents, 41 cents]). Conversely, in the presence of outcome threat, participants in the high-hope condition made larger bets (M = 25 cents, SE = 5 cents, 95% CI [15 cents, 35 cents]) than did participants in the low-hope condition (M = 16 cents, SE = 6 cents, 95% CI [4 cents, 28 cents]), supporting H2a. Figure 3 illustrates the identified interaction effect.

Both the effect of hope on the betting amount ($p > .70$) and the effect of outcome threat on the betting amount were nonsignificant ($p > .25$). Further, none of the control variables had a significant effect ($ps \geq .10$).

Discussion

Study 4 supported our hypotheses while replicating Studies 2 and 3. Importantly, Study 4 provided greater ecological validity by placing participants into a bidding session of the popular TV show *Storage Wars*. Further, while Studies 2 and 3 induced hope indi-
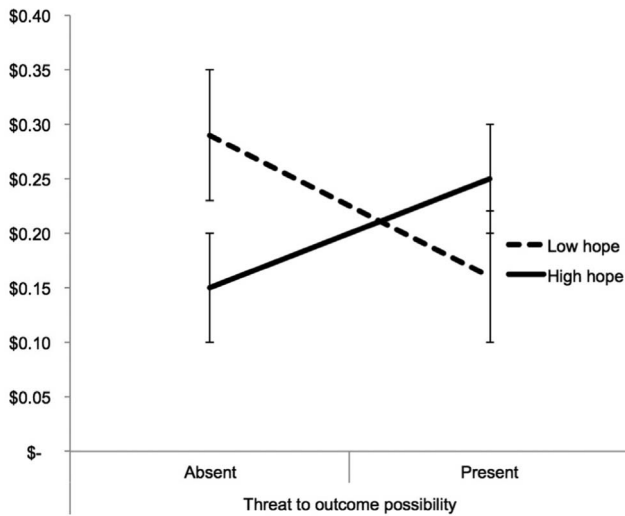
Figure 3. Study 4: Interaction effect between hope and absence or presence of threat to outcome possibility on betting amount on winning a storage locker (in $).

rectly through vignette studies, Study 4 directly induced states of hope by allowing hope to increase naturally as a consequence of the manipulated decision environment.

Study 5 attempted to build on the previous studies in several ways. First, we further tested the generalizability of our findings by investigating the effects in the different financial decision making context of retirement savings. Unlike previous studies, in which risk–return payoffs were realized immediately, the risk–return payoffs in a retirement context are realized over the long term (i.e., at retirement). Furthermore, unlike Studies 2 and 3, which manipulated hope, Study 5 measured hope. Finally, Studies 2, 3, and 4 examined only risk-related behaviors (relevant to H1a and H2a), not the underlying psychological processes predicted to give rise to these actions (relevant to H1b and H2b); Study 5 aimed to test H1b and H2b by assessing the mediating roles of the motivation to avoid losses versus the motivation to achieve gains under conditions of low- versus high-outcome threat.

Study 5: Saving Money for Retirement

Overview and Methods

Study 5 presented a realistic investment opportunity that most individuals are likely to face in their lives: that of making decisions about investments in defined contribution plans (e.g., 401k, 403b, 457b), which are retirement plans in which employees decide how much of their salaries (up to a regulated maximum) they wish to put aside in an investment account that is free from taxation until the funds are withdrawn during retirement. Defined contribution plans, which have largely supplanted traditional employer pension plans in the United States, carry a risk, in that the investments the employee chooses for the money that is contributed to the plan can either increase or decrease in value. That is, such investments are not guaranteed to grow or to grow sufficiently to support the employee's desired retirement lifestyle.

Participants. Six hundred four adults (53% female, M_{age} = 40 years) from a major American consumer panel professionally managed by Qualtrics Labs participated in exchange for monetary compensation. Of the 604 participants, 447 decided to enroll in a 401k defined contribution plan, before the study was conducted, and were thus included in our data set. All respondents were under age 65 and none were drawing on retirement savings. We measured participants' hope regarding the prospect of a financially secure retirement using the measure described below.

Hope measurement. Hope was measured first by asking participants to think about the extent to which they hoped to actually have enough money to retire comfortably upon reaching retirement age, and then by asking them two questions related to their level of hope for this goal-congruent but uncertain outcome. Specifically, they were asked to indicate the extent to which they hoped for a financially secure retirement (1 = *a little*; 9 = *a lot*) and the extent to which they had a strong desire to have enough money saved to retire comfortably upon reaching retirement age (1 = *strongly agree*; 9 = *strongly disagree*; Cronbach's α = .80).

Participants were then asked to imagine that they had the opportunity to participate in a defined contribution plan being offered by their employer. Participants received general facts about defined contribution plans and were told that they could choose to invest or not invest in the plan. If they chose to invest, they received detailed descriptions of different mutual funds among which they could choose to invest. Each fund had a different level of risk and return. Specifically, one was a high-risk stock fund, one was a low-risk bond fund, and one was a very-low-risk money market fund. The fund descriptions incorporated actual fund data from a major mutual fund company (i.e., Vanguard), although no brand-identifying information appeared in the study.

Outcome threat manipulation. Participants were randomly assigned to one of the two outcome threat conditions (outcome threat: absent vs. present). Outcome threat was manipulated between subjects. Before using the outcome threat manipulations in the main study, we conducted a separate pretest (N = 54) that verified that the manipulations created conditions of high- versus low-outcome threat. Participants in the outcome threat-absent condition were asked to read a document stating that the likelihood of attaining a secure retirement was unchanged and that prior projections about retirement saving were correct, as follows:

> Many experts now agree that Americans' retirement savings are consistent with what the industry typically proclaims. It is generally recommended that one needs to build a nest egg big enough to replace 80% of one's preretirement income. A recent report issued by the Center for Retirement Research reveals that prior projections about Americans' retirement saving are correct and consistent with what they would likely need and the likelihood of attaining a secure retirement is unchanged. The biggest factor explaining the unchanged confidence in American's savings for retirement comes from recent reports released by experts at leading national universities. These reports show that financial planners and online calculators correctly estimate the amount of money people will need in retirement.

Participants in the outcome threat-present condition read a different document, which was designed to lower their confidence about attaining a secure retirement:

> Many experts now agree that Americans are doing an even worse job of saving for retirement than the industry typically proclaims. It is

generally recommended that one needs to build a nest egg big enough to replace 80% of one's preretirement income. A recent report issued by the Center for Retirement Research reveals that a significant number of Americans will not reach this figure. Thus many Americans will not be able to maintain their customary standard of living throughout retirement. The biggest factor explaining the declining confidence in American's savings for retirement comes from recent reports released by experts at leading national universities. These reports show that financial planners and online calculators can underestimate the amount of money people will need in retirement. Hence, they may advise many people to save too little. Advice produced by these planners and calculators can lead to dramatic undersaving, due to estimates that can be from 36% to 78% too low. Furthermore, in the future, Social Security is likely to be underfunded, so it will not continue to facilitate the ability of ordinary Americans to maintain a reasonable standard of living throughout their retirement years.

After reading the document, pretest participants then rated their agreement (1 = *strongly disagree*; 7 = *strongly agree*) with the following items: "After reading the information about the studies done on investing, I feel less confident that I will be able to save enough money for retirement"; "My confidence in my ability to save for retirement was shaken after reading this information"; and "After reading the information about the studies done on investing, I have a stronger sense that having a secure financial situation upon retirement is possible" (reverse-coded; Cronbach's α = .67). As expected, participants in the outcome threat-present condition reported significantly higher levels of outcome threat (M = 4.00, SD = .99) than did participants in the outcome threat-absent condition (M = 3.29, SD = 1.33), t(52) = 2.16, independent samples p < .05, 95% CI [.05, 1.37], Cohen's d = .61, 95% CI around effect size [.22, .99]. Based on results from this pretest, we concluded that the outcome threat manipulation was successful, so it was used in our main study.

Dependent measure. In the main study, and following the outcome threat manipulation, we measured financial risk seeking, operationalized as the percentage of participants' defined contribution plan savings that they would allocate to a high-risk stock-based retirement plan. The proportion of defined contribution plan savings that respondents chose to place in the high-risk stock-based retirement plan served as the dependent variable.

Psychological process variables. As discussed, we predicted that motivation to avoid losses would mediate the relationship of hope to risk seeking when outcome threat was absent, whereas motivations to achieve gains would mediate the relationship of hope to risk seeking when outcome threat was present. To test these hypotheses, we asked participants to indicate the extent to which they based their decisions on their motivations to achieve gains and to avoid losses. Finally, participants completed a set of control variables, as described below, and reported their age and gender. We measured motivation to achieve gains by the extent to which respondents agreed with the following statement in regard to their investment choices: "I was motivated to choose investments that would enhance my ability to achieve substantial gains in my retirement savings" (1 = *strongly disagree*; 9 = *strongly agree*). We assessed motivation to avoid losses by the extent to which respondents with this statement: "I was motivated to choose investments that would enhance my ability to avoid substantial losses in my retirement savings" (1 = *strongly disagree*; 9 = *strongly agree*). We calculated the correlation coefficients between

hope and the two process variables motivations to achieve gains and motivation to avoid losses. The correlation matrix is shown in the online supplemental materials.

Control variables. We measured state optimism with the following item: "The extent to which I am optimistic about having a financially secure retirement when I am of retirement age is" (1 = *very low*; 9 = *very high*). Trait optimism (Cronbach's α = .89) and trait risk aversion (Cronbach's α = .54) were measured as in Studies 1 through 4. We measured participants' state fear of not being able to achieve a secure retirement using two items: "I have a strong fear about not having a financially secure retirement when I am of retirement age" and "Thinking about having enough money to retire comfortably when I am of retirement age makes me feel fearful that I might not be able to achieve this goal" (1 = *strongly disagree*; 9 = *strongly agree*; Cronbach's α = .90). Subjective knowledge about investing was measured by asking participants whether they agreed with the following statements: "You know more about investing compared to others"; "Others ask you for investment advice"; and "You feel confident in your investment abilities" (1 = *strongly disagree*; 9 = *strongly agree*; Cronbach's α = .93).

Results

Interaction effect. A linear regression analysis was conducted with hope, outcome threat, and their interaction as independent variables. State and trait optimism, state fear, trait risk aversion, and knowledge about investing were entered as control variables in the regression at Step 1 together with the independent variables. The proportion of defined contribution plans savings in a high-risk stock-based retirement plan was the dependent variable. Results revealed the predicted two-way interaction between hope and outcome threat on the proportion of defined contribution plan savings in a high-risk stock-based retirement plan, b = 2.55, SE = .74, p < .001; $b_{standardized}$ = .16. To explore the interaction, we conducted a follow-up spotlight analysis (Fitzsimons, 2008), depicted in Figure 4.

Specifically, we examined the slopes of hope when outcome threat was absent versus present. When outcome threat was absent,
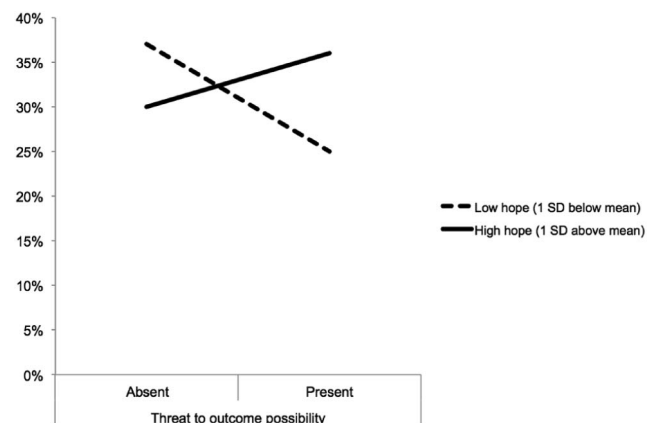

Figure 4. Study 5: Interaction effect between hope and absence or presence of threat to outcome possibility on investment allocations into risky fund (in %). Error bars are not shown because means were calculated using the Spotlight technique (±1 *SD* from the mean).

the slope of hope was significant and negative, $b = -1.96$, $SE = .96$, $p < .05$, $b_{standardized} = -.13$, suggesting that as hope increased, individuals made significantly fewer allocations into a high-risk stock-based retirement plan. On the other hand, when outcome threat was present, the slope of hope was significant and positive, $b = 3.16$, $SE = 1.13$, $p < .01$, $b_{standardized} = .20$, suggesting that as hope increased, individuals made significantly more allocations into a high-risk stock-based retirement plan. These results confirm that higher hope was related to less financial risk seeking when the outcome possibility was not threatened, but it was related to more financial risk seeking when the outcome possibility was threatened, supporting H1a and H2a. The overall model was also significant, $F(10, 416) = 7.05$, $p < .001$. Of the control variables, only trait risk aversion, $b = -2.31$, $SE = .87$, $p < .01$, $b_{standardized} = -.13$, and knowledge about investing, $b = 2.63$, $SE = .61$, $p < .01$, $b_{standardized} = .22$, had significant effects on the proportion of defined contribution plans savings in a high-risk retirement plan.

Mediation effects. We next assessed the mediating roles of motivation to avoid losses and motivation to achieve gains. According to H1b and H2b, the pattern of mediation should vary across conditions; hence, we tested for moderated mediation (Hamilton & Biehal, 2005). We tested for mediation separately in each of the two experimental conditions. First, we assessed whether, in the outcome threat-absent condition, motivation to avoid losses mediated the effects of hope on financial risk seeking (Baron & Kenny, 1986). As we noted earlier, hope was a significant negative predictor of financial risk seeking, $b = -1.96$, $SE = .96$, $p < .05$, $b_{standardized} = -.13$. Second, we regressed the motivation to avoid losses on hope, $b = .38$, $SE = .07$, $p < .001$, $b_{standardized} = .35$. Third, we regressed financial risk seeking on the mediator, $b_{avoid} = -5.59$, $SE = .82$, $p < .001$, $b_{standardized} = -.43$. Fourth, we regressed financial risk seeking on both hope and the mediator. This final analysis showed that the mediator was a significant predictor of financial risk seeking, $b_{avoid} = -5.61$, $SE = .88$, $p < .001$, $b_{standardized} = -.43$, whereas the effect of hope became nonsignificant, $b = .07$, $SE = .95$, $p > .10$, $b_{standardized} = .01$, suggesting full mediation. A Sobel test confirmed these mediational results, Sobel $z_{avoid} = -3.50$, $p < .001$. In addition, we used the more powerful bootstrapping estimation of conditional indirect effects to test mediation (Preacher & Hayes, 2004; Zhao, Lynch, & Chen, 2010). The estimated 95% CI around the indirect effect of avoidance motivation on risk taking does not contain zero (-3.03 to -1.01), thus supporting mediation. These results support H1b, showing that in the absence of outcome threat, participants' motivations to avoid losses fully mediate the effects of hope on financial risk seeking.

Next, we tested whether motivation to achieve gains mediated the effects of hope on financial risk seeking in the threat-present condition. First, as noted earlier, we found that when outcome threat was present, hope was a significant positive predictor of financial risk seeking, $b = 3.16$, $SE = 1.13$, $p < .01$, $b_{standardized} = .20$. Second, we regressed the motivation to achieve gains mediator on hope. As expected, under conditions of a present outcome threat, greater hope was linked with higher motivation to achieve gains, $b = .29$, $SE = .06$, $p < .001$, $b_{standardized} = .29$. Third, we regressed risk taking on the predicted mediator, $b_{achieve} = 5.49$, $SE = 1.05$, $p < .001$, $b_{standardized} = .32$. Fourth, we regressed

financial risk seeking on both hope and the mediator. This final analysis showed that the mediator was a significant predictor of financial risk seeking, $b_{achieve} = 5.01$, $SE = 1.10$, $p < .001$, $b_{standardized} = .29$, whereas the effect of hope became nonsignificant, $b = 1.68$, $SE = 1.12$, $p > .10$, $b_{standardized} = .09$, suggesting full mediation. A Sobel test confirmed this mediational result, Sobel $z_{achieve} = 3.55$, $p < .001$. Moreover, using the bootstrapping estimation of conditional indirect effects, we found that the estimated 95% CI around the indirect effect of achievement motivation on risk taking did not contain zero (.46 to 2.05), thus supporting mediation. These results support H2b; under conditions of outcome threat, the effect of hope on financial risk seeking is fully mediated by individuals' motivations to achieve gains. Figure 5 illustrates our meditational model.

Discussion

The results of Study 5 converge with those of Studies 2 through 4 while using a large-scale consumer panel. Higher levels of hope were associated with the creation of lower risk retirement investment portfolios (H1a) when threats to the hoped-for outcome (i.e., attaining a secure retirement) were absent. However, higher levels of hope were associated with the creation of higher risk portfolios when factors threatened investors' confidence in the possibility of attaining a secure retirement (H2a).

Importantly, Study 5 showed that when outcome threat was absent, hope was related to significantly less financial risk seeking, as it triggered motivations to avoid losses (H1b); on the other hand, when outcome threat was present, hope was related to significantly more financial risk seeking, as it triggered motivations to achieve gains (H2b).

General Discussion

Our research contributes to the literature on the role of emotions in risky decision making. Recent research demonstrating the importance of examining specific emotions (Lerner & Keltner, 2000; Raghunathan & Pham, 1999) emphasizes negative emotions, such as anger, anxiety, sadness, and fear (Cryder et al., 2008; Garg, Inman, & Mittal, 2005; Lerner & Keltner, 2001; Raghunathan, Pham, & Corfman, 2006), rather than positive emotions like hope. The present research is the first to examine a positive emotion
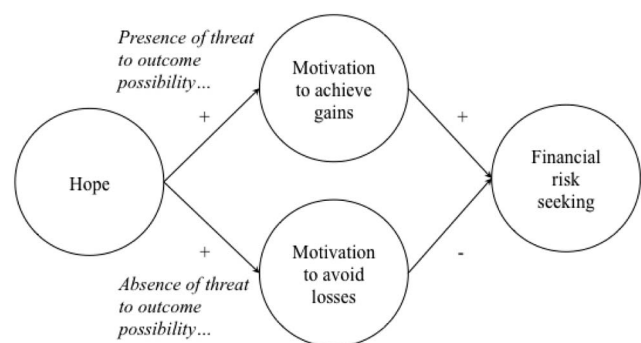
Figure 5. Study 5: Motivation to achieve gains and motivation to avoid losses differentially mediate the effect of hope on financial risk seeking, depending on whether a threat to outcome possibility is present.

(hope) in its impact on decision making characterized by risk. In particular, the financial decision-making contexts used in our studies contribute to research on behavioral finance, a field dominated by cognitively (vs. emotionally) focused research (for exceptions see Cryder et al., 2008, and Lerner et al., 2004).

Following our conceptual logic, Study 1 showed that hope is empirically distinct from related affective and/or risk related states and traits (e.g., mood, state fear, state optimism, trait optimism, and risk-seeking tendencies). Supporting our hypotheses, Studies 2 through 5 each showed that increases in hope induced *fewer* risk-seeking financial decisions when the outcome's possibility was not threatened, but *more* risk-seeking financial decisions when the outcome's possibility was threatened. These effects were observed under all of the following conditions: (a) when using different financial decision scenarios, (b) when applying different manipulations and operationalizations of hope and outcome threat, (c) when using either between-subjects or within-subjects designs, and (d) when controlling for alternative explanations of optimism, risk aversion, fear, and general mood states. From a process perspective, Study 5 suggested that, in the absence of outcome threat, high-hope individuals were driven by a motivation to avoid losses; however, when outcome threat was present, high-hope individuals were driven by a motivation to achieve gains.

Our identification of outcome threat as a critical moderator of the relationship between hope and risk-related behavior builds on recent research on the impact of such threats to consumer decision making and behavior (De Mello, et al., 2007). Our research also contributes to knowledge about constructs affecting individuals' retirement savings rates. Although researchers have explored various factors such as income, age, job tenure (Munnell, Sunden, & Taylor, 2001/2002), self-control failure (Laibson et al., 1998), and financial literacy (Lusardi & Mitchelli, 2007), work on the effects of emotions on retirement savings has been absent.

Limitations and Implications for Future Research

Although our results are provocative, they have some limitations, which lead to additional questions and pave the way for future research. First, we believe that the current research offers important implications for a myriad of decision contexts in which hope may be activated and situational factors can threaten an outcome's possibility (e.g., medical decision making or health care decisions). As such, it is important to determine whether these results are generalizable to other types of risky decisions. Second, our studies all involved saving money for utilitarian purposes as opposed to hedonic purposes (e.g., saving money to go on a vacation). It is possible that the effects of hope and outcome threat will differ in these different contexts. Third, our studies involved threats relevant to the dependent variable of financial risk seeking. Future studies should investigate whether threats that are central to the self, but not to financial risk seeking per se, would differentially impact the interaction effect of hope and threat on financial risk seeking. For example, investigators could test whether a threat to one's self-esteem has a similar or different impact. Fourth, this research focused on the effect on decision making of an integral emotion, that is, an emotion caused by the decision itself (for a discussion on emotions and decision making, see, e.g., Reimann & Bechara, 2010), whereas much extant research has investigated the effects of incidental emotions (i.e., decision-unrelated emotions).

Future research could address the possibility of important differences between integral and incidental emotions (including hope) on financial risk seeking.[1]

Implications for Individual Decision Makers and Public Policy Makers

The current research also has important implications for individuals' financial decision making, and hence for the design, presentation, and communication of defined contribution retirement plans and for financial advice and counseling strategies. Our findings suggest that individuals who strongly hope for positive financial outcomes, such as hoping for a secure retirement or their children's college educations, may be motivated to avoid losses and thus to make risk-averse investment choices. Notably, feelings of hope could, somewhat paradoxically, interfere with individuals' attainment of their desired long-term financial goals. If the emotion of hope results in financial choices that are too risk-averse, individuals may fail to generate the returns necessary to grow their chosen investments. Thus, when greater risk-taking behavior is normative (e.g., when investing while young), high levels of hope may be counterproductive. It is often recommended that younger (vs. older) investors take larger risks with their investments—such as investing a larger proportion of their money in stocks versus bonds or in foreign stocks and more (vs. less) volatile sectors of the economy, such as high technology, energy, and health—because a young person has many years to recoup a loss if it should occur. However, because of youthful exuberance, investors' levels of hope regarding investment outcomes may be particularly high when they are younger, which, according to our research, would lead to a preference for lower risk investment vehicles, such as savings accounts and bonds, and lower risk sectors of the economy, such as utilities and consumer durables. It may be warranted to counsel young investors regarding how their high levels of hope might impact their emotions and how their preference for risk might lead to suboptimal investment decisions.

Our findings also show that threatening the possibility of a hoped-for goal-congruent outcome may increase investors' willingness to accept risk. For example, the recent stock market crash, which wiped out much of the equity investments for near-retirement-age workers, led many of these individuals to decide to work longer than they had planned. It may also lead them to reallocate their remaining funds to higher risk options—a strategy that is typically not advisable for older investors, as they have fewer years in which to recoup the potential losses. In such situations, experiencing such impactful threats to hope might lead to nonoptimal outcomes such as unwarranted trading (Odean, 1999) and attempts to "win big." Thus, under threats to a hoped-for outcome's possibility, high levels of hope may be counterproductive when risk-avoidant behavior is normative (e.g., investing for retirement when one's retirement age is near).

Our findings also have implications for factors that might enhance consumers' vulnerability in financial domains beyond retirement. Research finds that the poor, people who have lost jobs, and those who are threatened by bankruptcy are particularly vulnerable to financial scams and predatory lending practices (Hill &

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[1] The authors thank one of the anonymous reviewers for raising the last two of these future research ideas.

Kozup, 2007; Lee & Soberon-Ferrer, 1997). Prior research attributes vulnerability to cognitive deficits and/or social factors (Lee & Soberon-Ferrer, 1997) rather than emotional factors such as hope. Our finding that risk-taking behavior is driven by motivation to achieve gains may also provide another explanation for the existence of vulnerability. When hope is threatened, consumers' motivation to achieve gains may make them more prone to motivated reasoning processes (De Mello, et al., 2007), which focus on information that supports the hoped-for outcome (e.g., easy credit) as opposed to information that underscores the risk-related implications of their actions (e.g., balloon payments).

Findings from the current research could lead to more effective ways of presenting choice options to individuals. For example, in the domain of lending, information should be presented in a way that highlights the risk-related implications of interest rates and payment options. Presenting such information clearly and in a balanced way is particularly important, because risk-related implications of credit and loans are often buried in the small print. In the area of defined contribution plans, it has been shown that when employees are presented with a larger (vs. smaller) number of investment options from which to choose, they become overwhelmed and defer their retirement investment choice, because of fear of the risk involved if they make the "wrong" choice (Huberman, Iyengar, & Jiang, 2007). It may be that this tendency is exacerbated when high levels of hope are not threatened. Such an effect may be more likely to occur among younger employees, who possess higher levels of hope for their financial future and are not yet faced with the prospect of retirement. Providing informational brochures with defined contribution plans that balance such high hopes might help to offset the tendency to defer such decisions.

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