

## When good decisions have bad outcomes: The impact of affect on switching behavior<sup>☆</sup>

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### Abstract

Four experiments test the hypothesis that an unfavorable outcome of a good decision leads individuals to switch away from that decision due to negative emotional responses to the outcome. Negative emotional reactions led many participants to abandon the option that they recalled as having been more successful overall in the past (Study 1) and which they expected to perform better in the future (Study 2). A prompt to consider the future success rates of the two alternatives did not eliminate switching (Study 2). An experimental manipulation in Study 3 indicated that individuals switch when they focus on their affective reactions rather than beliefs about the earlier disappointing outcome. In Study 4, individuals with a general tendency to focus on cognitions (i.e., those high in need for cognition) were less likely to switch away from the better option following a disappointing outcome. These results suggest that an emotional reaction to a negative outcome can lead people to switch away from the options that they believe are most likely to be successful on the next occasion.

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It is frustrating but true that even one's best decisions sometimes result in unwanted outcomes. The best surgical procedure sometimes fails, a favored stock can lose money, and a typically sunny region may see rain during

a well-planned vacation. When a positive outcome is not a certainty, even one's best decisions will sometimes produce undesirable results. Individuals who have chosen the best available alternative and obtained an unfavorable outcome may therefore perceive a dilemma when trying to decide what to choose on a subsequent occasion: should they choose again the option that is most likely to succeed but has disappointed them in the past, or should they choose the initially foregone alternative with which they have no previous experience and which is even less likely to produce a favorable result?

We propose that the negative affect generated by one's initial unfavorable outcome will sometimes lead people to abandon the very decision that has the best chance of meeting their needs in the future. Whether individuals are willing to stick with these good decisions likely depends on the extent to which they are focusing on their negative emotional responses to the previous

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outcome rather than a more rational consideration of the extent to which even their good decisions will sometimes produce disappointing results.

### The impact of outcomes

Research indicates that decision outcomes have a strong influence on people's evaluations of the quality of decisions made by others. For example, people rate others as better thinkers, more competent, and having engaged in better decision making when their decisions have a favorable outcome (Alicke, Davis, & Pezzo, 1994; Allison, Mackie, & Messick, 1996; Baron & Hershey, 1988). Participants in one study rated a physician as having made a better decision when they learned that the chosen procedure—with an 8% chance of the patient's death—had a successful rather than an unsuccessful outcome (Baron & Hershey, 1988). This occurs in part because the knowledge of a bad outcome makes salient those arguments that would have made the decision a bad one (Alicke et al., 1994; Hawkins & Hastie, 1990). For example, the knowledge that the surgery resulted in death may make the decision to perform the surgery seem like a bad one because the risk of complications is perceived to be higher following the negative outcome. As a result, evaluators blame the outcome on the decision maker, holding the person responsible for what was in fact simply bad luck.

Do people evaluate the merit of their own decisions, as well, based on the outcomes of those decisions? Reinforcement models of human learning indicate that people are more likely to repeat actions that have produced favorable outcomes in the past (Erev & Roth, 1998; Hammond, Summers, & Deane, 1973; Thorndike, 1898). Looking back at their decisions enables people to learn from mistakes and prevents them from making similar errors in the future (Zeelenberg, 1999; Zeelenberg, Inman, & Pieters, 2001). Indeed, previous research indicates that individuals rate their own decision quality as worse when they learn that the chosen alternative failed to meet their expectations (Abendroth, 2001; Jones, Yurak, & Frisch, 1997).

An extensive literature on regret indicates that people wish they had made a different decision when they learn that their chosen option resulted in an outcome either known or imagined to be worse than the outcome of a foregone option (Inman, Dyer, & Jia, 1997; Tsiros, 1998; Tsiros & Mittal, 2000). A bad outcome coupled with the feeling that one made a poor decision may lead individuals to switch away from the initially selected option on the next decision occasion (Connolly & Zeelenberg, 2002; Zeelenberg et al., 2001; Zeelenberg & Pieters, 1999). For example, Zeelenberg and Pieters (1999) found that individuals' feelings of regret about a failed service encounter significantly predicted their tendency to

switch away from that choice alternative on a subsequent occasion (i.e., to switch to a different service provider). It is worth noting that research on regret typically includes decision tasks in which the decision options are quite similar to each other: in those studies, one option is not a priori a clearly better choice than the other (e.g., Abendroth, 2001; Jones et al., 1997; Tsiros & Mittal, 2000). For this reason, it may often be adaptive for individuals to learn which options to avoid in the future from their feelings of regret (Zeelenberg, 1999); if people come to believe that they initially chose the worse option, it makes sense for them to switch to something else next time.

However, in situations in which an initial good decision continues to have a higher probability of future success than the alternatives, one would maximize the likelihood of success by making the same decision on the next occasion. Recent research indicates that individuals making repeated choices among a limited set of alternatives often switch away from liked options (e.g., songs) to other options from which they expect to derive less pleasure (Kahn, Ratner, & Kahneman, 1997; Ratner, Kahn, & Kahneman, 1999). Similarly, research on probability matching indicates that people making choices between two options (only one of which will succeed on each trial) do not always choose the higher-probability option (Shanks, Tunney, & McCarthy, 2002). It seems likely that negative emotional reactions to an unfavorable outcome might exacerbate switching away from the best choice alternatives.

Indeed, previous research indicates that outcome feedback can impair performance on a learning task (Arkes, Dawes, & Christensen, 1986; Hammond et al., 1973; Schmitt, Coyle, & King, 1976). For example, individuals participating in a multiple-cue probability learning task provided less consistent responses (i.e., they deviated from using cues in a way most likely to generate an accurate answer) after a negative outcome than did those who did not receive the outcome feedback (Schmitt et al., 1976). Deviation from optimal responses does not appear to stem from a lack of motivation to provide accurate responses. In fact, there is evidence that these deviations are exacerbated when respondents are given financial incentives for correct answers (Arkes et al., 1986). Such results suggest that people sometimes deviate from the option that has the highest probability of success in an effort to account for all of the variance by switching to other choice alternatives (e.g., they do not want to stick with a strategy that is correct only 80% of the time but rather switch in an attempt to generate a successful response in those additional 20% of the cases; Dawes, 1979).

Whereas these earlier explanations for switching away from best options focus on cognitive explanations for switching, such as learning or a desire to account for all of the variance, we hypothesize that switching away

from best alternatives sometimes will be driven by negative emotional reactions following an unfavorable outcome and that the probability of staying with the initial good choice will be increased by focusing on beliefs (i.e., cognitions) about the decision. Although some research highlights the important adaptive role played by both negative and positive emotions (Damasio, 1994; Frederickson, 2001), we draw here from other research suggesting that affective responses can lead individuals to make suboptimal decisions (e.g., Denes-Raj & Epstein, 1994; Loewenstein, 1996; Loewenstein, Weber, Hsee, & Welch, 2001; Shiv & Fedorikhin, 1999). For example, participants in one paradigm are presented with two different trays from which to draw randomly one jellybean: one tray contains 100 jellybeans, including 7 of the winning color (i.e., 7%) and the other tray contains containing 10 jellybeans, including 1 of the winning color (i.e., 10%; Denes-Raj & Epstein, 1994). Results indicate that when participants are asked to make repeated choices from the two trays, a significant majority (e.g., over 80%) make at least one suboptimal choice (i.e., choosing from the tray with the lower percentage of winning jellybeans). Participants reported that although they *knew* that they were more likely to win if they pulled from the smaller, higher-probability tray, they *felt* that they were more likely to win with the larger, lower-probability tray. Other research indicates that emotional reactions actually can distort perceptions of risk: if people like an activity, they perceive the risk of negative consequences to be lower (Slovic, Finucane, Peters, & MacGregor, 2002). Strong visceral reactions to a drug or object of romantic interest can lead people to approach stimuli that they should avoid, and strong fear reactions to objectively unthreatening stimuli can lead people to avoid objects to such a degree that they experience immobilizing phobic reactions (Loewenstein et al., 2001). Thus, when the “heart and mind conflict” (Shiv & Fedorikhin, 1999), the heart often wins out.

### The present research

The goal of the present research is to test whether negative affect following an unfavorable outcome can induce individuals to stray from a better option to one less likely to succeed. Building from recent research on the ways in which affect can lead to suboptimal decisions, we explore whether switching behavior following a negative outcome stems from emotion rather than a cognitive appraisal that a switch will be more likely to produce a successful outcome on the next occasion. Along these lines, Zeelenberg (1999) suggested that regret may sometimes have the negative consequence of leading people away from better options following an unfavorable outcome. Data collected by Zeelenberg, Keren, and Gerritsen (1997; cited in Zeelenberg et al., 2001) are rele-

vant to this idea: in their study, participants were asked to select a ball from one of two urns following the Denes-Raj and Epstein (1994) jellybean paradigm described earlier (i.e., the urn containing fewer balls included a higher percentage of winning balls). Results indicated that when their draw from the urn produced an unfavorable outcome, people felt regret and in some cases switched to the other urn on the next occasion. Specifically, when the outcome of the initial draw was unfavorable, 19% (6 of 32) of the people who had initially selected the lower-probability urn and 6% (6 of 103) of the people who had initially selected the higher-probability urn switched to the other urn. The results of this study nicely demonstrate the role of regret in leading people to switch from one urn to the other following a negative outcome (particularly, in encouraging people to abandon the lower-probability but more viscerally appealing urn for the higher-probability one). In addition, the finding that some participants switched away from the higher-probability urn to the lower-probability urn following an unfavorable outcome is consistent with the hypothesis that regret sometimes leads people to switch away from a good decision following a disappointing outcome. However, the design of the study does not provide a test of the present hypothesis that the amount of switching away from the better option following a bad outcome is greater than the amount of switching away from the better option following a good outcome.

The present studies examine whether negative emotional reactions to bad (compared to good) outcomes lead people to switch away from the decision that is most likely to produce a successful outcome on the next occasion. Whereas earlier research suggests that individuals switch away from an initially chosen option when they expect the initially unchosen option to outperform the initially chosen option on the next occasion, we propose that feelings of regret induce switching behavior even when individuals expect that the option from which they are switching is likely to outperform the option to which they are now turning. We test the hypothesis that it is a focus on emotional reactions to the preceding outcome that leads people to switch, rather than a belief on the part of these decision makers that a switch is more likely to produce a successful outcome on the next occasion. To test whether affective versus cognitive explanations underlie the switching behavior, we include measures of affect and cognitions in our studies, as well as manipulations of whether individuals focus on affect versus various types of cognitions related to the choice task.

In these studies, participants choose between two options, one of which we describe as having an overall better success rate than the other. After making their choice, individuals learn either that the option they chose succeeded or failed to meet their objectives and are asked which of the two they would choose on the next

occasion. Study 1 examines whether regret leads individuals to switch away from a good decision that had a bad versus a good outcome. Study 1 also is designed to rule out several cognitive explanations for switching, including that individuals do not remember the overall success rates of the two choice alternatives or that individuals have updated their beliefs about the future likelihood of success of the two choice alternatives such that they now expect the initially unchosen option to outperform the initially chosen option. Study 2 tests the prediction that a focus on future success probabilities of the choice options will attenuate rather than promote switching behavior. In Study 3, we examine whether individuals switch more when they are prompted to focus on affect rather than cognitions following the outcome information. Study 4 further investigates the role of a cognitions focus by exploring whether individuals with a chronic willingness to engage in effortful thinking (i.e., those high in need for cognition; Cacioppo & Petty, 1982) are more inclined to choose again the better option that had produced a bad outcome.

### Study 1

Study 1 explores several possible reasons why people might switch away from a probabilistically favored alternative following an unfavorable outcome. As described earlier, our key hypothesis is that individuals' emotional reaction to the negative outcome leads them to switch away from the option with the overall better history of success. However, we test several cognitive explanations for switching behavior as well. First, this experiment examines whether prior probabilities of success become less salient after an individual learns about a disappointing outcome. Just as individuals often treat decisions based on the specifics of the present case rather than considering it within a broader context of similar instances (Kahneman & Lovallo, 1993; Kahneman & Tversky, 1973), individuals may focus more on their initial and only experience with a choice alternative rather than on the overall history of success of the choice options. Second, this study investigates whether individuals are unable to remember accurately those original probabilities after the disappointing experience: following the negative outcomes, they may remember the originally better option as having a worse past success rate than the foregone option. Finally, this experiment tests whether individuals who learned that their initial choice resulted in an unfavorable outcome expect the initially better option to have a lower likelihood of success on the next occasion than the foregone option. We expected that it is the emotional reaction to the unfavorable outcome rather than changes in beliefs about the success rates that leads people to abandon a better-performing option following a negative outcome.

### Method

#### *Participants and design*

Ninety-one undergraduates (58 females and 33 males) participated in this study as part of a course requirement. The study employed a 2 (decision outcome: success vs. failure)  $\times$  2 (recall prompt: presence vs. absence of a prompt to recall prior success rates before making the second decision) between-participants design.

#### *Procedure*

Participants came to the lab for a study titled "Stock Choices." Participants were asked to read an excerpt describing a situation in which they had \$5000 to invest with one of two brokers (Broker A or Broker B). They read that Broker A had a 43% chance of success and Broker B had a 54% chance of success; failure rates were not shown. Success was defined as having increased the \$5000 investment by 15% or more in the 12 months since the money had been invested. After viewing the before-choice probabilities of success for each broker, participants were instructed to circle with which of the two brokers they would like to invest the \$5000.

Next, the experimenter asked participants to turn in the sheet of paper containing the success rates of each broker and their decision. This ensured that participants would not look back onto this first sheet when asked to recall these prior probabilities. After they completed various filler tasks for approximately 20 min, participants received feedback indicating whether their broker had succeeded or failed to meet their investment objectives. Participants in the success conditions learned that "Your chosen broker has invested your \$5,000 in her/his favorite stock and the investment has grown tremendously. Clearly, the investment idea was successful. Your \$5,000 is now worth \$5,750. Your broker's investment decision has clearly increased the value of your investment by 15% this year." To ensure that participants would encode the failure feedback to be unfavorable, we described a case of failure in which they not only did not grow their investment by 15% but also in fact lost money. Specifically, participants in the failure conditions learned that "Your chosen broker has invested your \$5,000 in her/his favorite stock and the investment has lost 15%, or \$750, in its value. Clearly, the investment idea was unsuccessful. Your \$5,000 is now worth \$4,250. Your broker's investment decision has clearly decreased the value of your investment by 15% this year."

After being informed of their broker's success or failure, participants in the recall condition were asked to recall the prior probabilities of success for each of the two brokers. First, they were asked to fill in a blank indicating the success rate for their chosen broker before the broker had invested their money. Next, participants in the recall condition were asked to recall the success rate for the broker that they had not selected.

All participants then indicated how they felt about their decision on a number of dimensions. Participants reported the extent to which they felt regret about the decision, how good they thought the decision was, how sensible they thought the decision was, and the degree to which they wished they had chosen the other broker, on 7-point scales where 1 = *not at all* and 7 = *very much*. In addition, they noted which broker they would choose the next time they had \$5000 to invest.

After completing these measures, participants responded to a number of follow-up items. Participants who had not been prompted to recall before-choice probabilities of the chosen and unchosen broker before making their choices were asked to do so at this point. All participants next reported their estimates of how likely (in percentages) the initially chosen broker and the initially unchosen broker would be to succeed if selected on the next occasion. Finally, respondents reported their sex, age, and amount of investment experience.

## Results

As expected, almost all participants initially selected the broker with the overall better history of success (i.e., Broker B with a 54% success rate). The two participants who initially chose Broker A, described as having a 43% success rate, were excluded from the analyses that follow. There were no significant effects for gender, age, or investment experience in any of the four studies and these variables will not be discussed further.

### Ratings of initial decision

Analyses were performed to test whether individuals felt worse about their decision when they learned that their chosen broker failed rather than succeeded to meet their investment objectives. We calculated the average of participants' ratings of how sensible and good they felt their decisions were (these two items were strongly correlated,  $r = .54$ ,  $p < .0001$ ).<sup>2</sup> As predicted, participants rated their decisions as having been less favorable on this composite measure when they learned the broker failed ( $M = 4.57$ ) versus succeeded ( $M = 6.33$ ) in meeting their investment objectives,  $F(1, 85) = 56.41$ ,  $p < .0001$ . In addition, a main effect of the recall prompt was obtained on the rated favorableness of the decision: participants rated their decision as better if they had been asked to recall the priors before versus after providing their favorableness ratings ( $M_s = 5.76$  in the recall condition vs. 5.19 in the no-recall condition),  $F(1, 85) = 4.78$ ,  $p < .05$ .

To examine the impact of the decision outcome and the recall prompt on reported regret, we calculated the

average of participants' ratings of how much they regret their decision and the extent to which they wish they had chosen the other broker ( $r = .76$ ,  $p < .0001$ ). Using this composite measure of feelings of regret, we found as expected that participants with brokers who were successful regretted their decision less ( $M = 1.40$ ) than participants whose brokers were unsuccessful ( $M = 4.31$ ),  $F(1, 85) = 149.94$ ,  $p < .0001$ . A marginal effect of the recall prompt was obtained, as participants reported less regret if they had been asked to recall the priors before rating their feelings of regret ( $M = 2.57$  in the recall condition vs. 3.06 in the no-recall condition),  $F(1, 85) = 2.88$ ,  $p < .09$ .<sup>3</sup>

### Choice on subsequent decision

Almost all (44 out of 45) participants who learned that their broker was successful said they would choose the same broker next time, whereas only 77% (33 out of 43) who learned that their broker was unsuccessful said they would choose the same broker the next time they had \$5000 to invest.<sup>4</sup> Logistic regression was used to determine the impact of outcome feedback and the recall prompt on switching behavior. No main effect of the recall prompt was obtained on switching away from the initially chosen broker ( $B = -.669$ , Wald = .91,  $p = .34$ ). However, the predicted main effect of outcome feedback was obtained ( $B = -2.58$ , Wald = 5.76,  $p < .05$ ). As a next step, we examined whether the interaction between the recall prompt and outcome feedback was significant; no interaction emerged between the recall prompt and the outcome feedback ( $B = 6.74$ , Wald = .04,  $p = .84$ ). The finding that switching was not attenuated when priors were made salient suggests that switching is not due to a lack of salience of those prior success rates.

A series of regression analyses were performed to test whether regret mediated switching in this study (Baron & Kenny, 1986). As noted above, results indicated that outcome (i.e., success vs. failure) predicted how likely participants were to switch, and outcome also predicted reported regret ( $B = 2.91$ ,  $t = 12.16$ ,  $p < .0001$ ). When both outcome and regret were entered simultaneously into the regression equation, regret continued to be a

<sup>2</sup> The pattern of results is the same when we look at ratings for each of these dependent measures separately. This is true throughout the manuscript when we use a composite score, unless otherwise noted.

<sup>3</sup> An analysis performed only on participants' reports of how much they "regret the decision" they made (i.e., not combined with the ratings of how much they wished they had chosen the other broker) also revealed a significant Outcome  $\times$  Recall interaction,  $F(1, 96) = 6.00$ ,  $p < .05$ , indicating that participants felt less regret in the case of failure following the recall prompt, but not in the case of success following the recall prompt. A similar pattern emerged on the "wish chose other broker" measure, although on that measure, participants in both the success and failure conditions tended to give lower ratings of regret in the recall condition, and the interaction in that condition did not approach significance.

<sup>4</sup> One participant who did not report a choice for the second occasion was excluded from this analysis.

significant predictor of switching ( $B = -1.29$ , Wald = 9.98,  $p < .01$ ) whereas the effect of outcome failed to reach significance ( $B = 1.37$ , Wald = .68,  $p = .41$ ). A Sobel test indicated that regret significantly mediated the impact of outcomes on switching behavior ( $Z = -3.06$ ,  $p < .01$ ).

#### *Recall of prior success rates of chosen versus unchosen broker*

Respondents who recalled prior success rates before versus after completing the other post-choice measures did not differ in their ability to remember the priors for the chosen and unchosen brokers ( $F < 1$  for the chosen broker and  $F = 1.15$  for the unchosen broker, *ns*). In addition, those who learned that their chosen broker failed to meet their investment objectives did not recall different priors for either the chosen or unchosen broker than did those who learned that their broker succeeded in meeting their investment objectives ( $M_s = 51.57$  and 49.47 in the success and failure conditions, respectively, for the chosen broker;  $M_s = 42.93$  and 43.02 in the success and failure conditions, respectively, for the unchosen broker),  $F_s < 1$ . There was no evidence, therefore, that participants who learned that their chosen broker failed recalled different priors than did those who learned that their chosen broker succeeded.

#### *Estimates of future likelihood of success*

Did individuals who learned that their brokers failed expect worse performance in the future from their original broker than did participants who learned that their brokers succeeded in meeting their investment objectives? As is evident in Fig. 1, individuals with brokers who were successful expected a higher likelihood of future success from that initially chosen broker

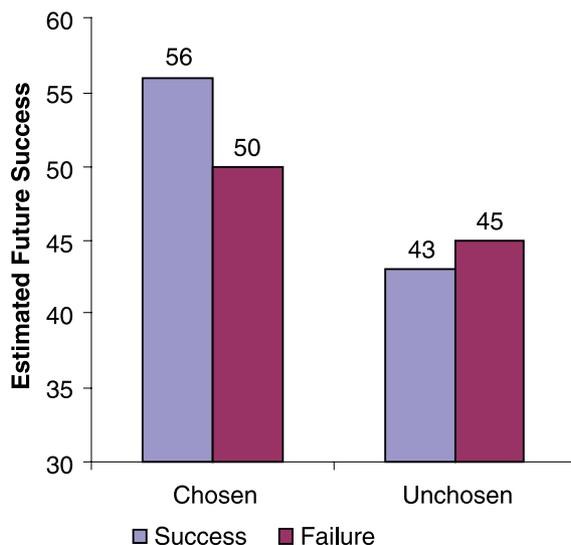


Fig. 1. Estimated future success percentages for the initially chosen versus unchosen broker (Study 1).

( $M = 55.59$ ) than did those whose brokers were unsuccessful ( $M = 49.76$ ),  $F(1, 83) = 5.46$ ,  $p < .05$ .<sup>5</sup>

However, an analysis was performed to examine whether the amount of updating that occurred is sufficient to explain why individuals switched away from the broker who failed to meet their investment objectives. Participants' expectations of how successful the unchosen broker would be in the future did not vary among conditions ( $p_s > .20$ ); on average, participants expected the initially unchosen broker to be successful 43.66% of the time. In a repeated-measures ANOVA, we included participants' expected likelihood of future success of the initially chosen versus the initially unchosen broker as a within-participants factor and whether or not the participant stayed with or switched from the initial broker as a between-participants factor. The main effect of the within-participants factor was significant, indicating that participants expected the initially chosen broker to outperform the initially unchosen broker in the future ( $M_s = 52.80$  vs. 43.69),  $F(1, 81) = 21.50$ ,  $p < .0001$ . No interaction was obtained between this within-participants effect and participants' decision to stay or switch ( $F < 1$ ), which demonstrates that even those who switched expected higher future success from the initially chosen option than from the option to which they switched. Among the participants who switched in the failure condition, 78% thought that the chosen broker would outperform the initially unchosen broker in the future.

#### *Discussion*

The results of this first study indicate that individuals feel regret if the decision outcome is bad, even when they have chosen the clearly better option. Their regret about the negative outcome reduces their willingness to make the same decision again. The results of Study 1 indicate that switching is not due simply to a lack of salience of the original probabilities of success: participants were as likely to switch away from the original decision when prompted to recall prior success rates as when not prompted to recall prior success rates before making the second decision. The results also suggest that switching was not due to distorted memory for the priors: a negative outcome for the initial choice did not disrupt people's ability to remember for which broker the previous success rates were more favorable. Finally, Study 1 indicates that people switch away from a decision that has a bad outcome even when they believe the originally chosen option is more likely to succeed in the future than the originally unchosen option.

<sup>5</sup> Two people did not provide future estimates for either the chosen or unchosen broker, two others did not report future estimates for the chosen broker, and one did not report a future estimate for the unchosen broker. Therefore, some analyses reported in this section do not include all 89 respondents.

It is interesting to note that there was a significant effect of the prompt to recall the prior success probabilities on participants' ratings of how good and sensible their decision was and the extent to which they regretted their decision. It appears that participants prompted to consider the overall prior success rates were more likely to understand that they had made a reasonable decision. However, this prompt to recall the priors did not appear to reduce regret sufficiently to discourage them from switching away from the broker who produced a disappointing outcome.

## Study 2

The results of Study 1 suggest that regret leads individuals to switch away from a good decision that had a bad outcome, even when they expect a higher likelihood of success in the future from that initially chosen option. However, it is unclear whether participants in Study 1 were thinking carefully about the future at the time they made their decision following a negative outcome; they did not report estimates of future success likelihood until after they had made their second decision. In Study 2, we seek to provide a stronger test of our hypothesis that individuals can be swayed more by affect than cognitions when making a decision about whether to stay with or switch from a better option following an unfavorable outcome. We test whether prompting individuals to report future success probabilities (i.e., a task requiring a focus on cognitions) before making a second decision will impact their decision to switch from or stay with the initial choice alternative.

If individuals switch because they think that the option to which they are turning will be more likely to produce a successful outcome, then we should see this reflected in their pre-switching estimates of the future success rates of the two options. In addition, if switching results from a desire to choose the option that is more likely to succeed on the next occasion, then a prompt to think about the future success likelihood should *increase* switching rates.

Our expectation, however, was that beliefs about future success rates do not underlie switching behavior, and that if anything, participants would be *less* likely to switch if focusing on the future success likelihoods because they expect the initially chosen option to continue to outperform the initially unchosen option. We expected that a prompt to consider the future success rates would be more likely to attenuate switching than the prompt used in Study 1 to consider past overall success rates, because whereas the past overall success rates may no longer seem relevant following participants' own experience and outcome with the chosen alternative, their estimates about the future reflect their current thinking about how successful each alternative is likely

to be for them on the next occasion. If individuals continue to switch brokers despite having just reported future success rates that the initially chosen broker will continue to outperform the initially unchosen broker, this will provide further evidence of the extent to which emotional reactions can lead individuals to switch.

## Method

### Participants and design

Five hundred ten undergraduates participated in this study as part of an hour-long experiment for course credit. The study employed a 2 (outcome: win vs. lose)  $\times$  2 (future prompt: presence vs. absence of a prompt to estimate future success rates prior to making the second decision) between-participants design.

### Procedure

As in the preceding study, participants were asked to choose between two brokers with whom to invest \$5000: one with a 43% likelihood of success and the other with a 54% likelihood of success. As in Study 1, participants were randomly assigned to receive feedback that their broker had failed (i.e., lost 15% of the value) or succeeded (i.e., gained 15% of the value) in meeting their investment objectives. Next, half of the participants were prompted to estimate the future likelihood of success of each of the two brokers before completing the remaining dependent measures. The other half of the participants were asked to estimate the future likelihood of success of each of the two brokers only after completing the remaining dependent measures.

On 7-point scales, participants indicated the extent to which they regretted the decision they made, thought they made a good decision, thought they made a sensible decision, and wished they had chosen the other broker (1 = *not at all*, 7 = *very much*). In addition, they indicated which broker they would choose the next time they had \$5000 to invest. Finally, the participants who had not been asked to consider future success probabilities prior to making their second decision were asked for the likelihood of future success for both the chosen and unchosen broker.

## Results

The participants who chose the worse broker on the initial occasion ( $n = 19$ ) were excluded from the analyses reported here.

### Ratings of initial decision

As before, we averaged participants' ratings of how sensible and good their decision was ( $r = .59$ ,  $p < .0001$ ). As expected, an ANOVA performed on this composite score indicated a main effect of outcome: participants evaluated their decision more favorably when their bro-

ker succeeded ( $M=6.41$ ) versus failed ( $M=4.64$ ) to meet their investment objectives,  $F(1,487)=289.16$ ,  $p<.0001$ . No main effect or interaction effect of the prompt to consider the future was obtained on participants' reports of how sensible and good their decision was ( $F(1,487)=1.33$  for the main effect;  $F<1$  for the interaction effect). We also averaged participants' ratings of how much they regretted their decision and the extent to which they wished they had chosen the other broker ( $r=.71$ ,  $p<.0001$ ). As expected, participants regretted their decision and wished they had chosen the other broker more when their broker failed ( $M=4.61$ ) versus succeeded ( $M=1.51$ ) in meeting their investment objectives,  $F(1,487)=764.44$ ,  $p<.0001$ . No main effect or interaction effect of the prompt to consider the future was obtained on these ratings of regret ( $F(1,487)=1.05$  for the main effect;  $F<1$  for the interaction effect).

#### Choice on subsequent decision

The percentage of participants in each condition who chose to return to the initially chosen broker appears in Fig. 2. Logistic regression was used to determine the impact of outcome feedback and the prompt to consider future success rates on switching behavior. The main effect of the prompt to consider future success rates was not significant ( $B=.41$ , Wald=2.08,  $p=.15$ ), although the predicted effect of outcome feedback was obtained ( $B=3.40$ , Wald=21.22,  $p<.0001$ ), indicating that people switched more following failure than success feedback. In addition, a significant interaction emerged between outcome feedback and the prompt to think about the

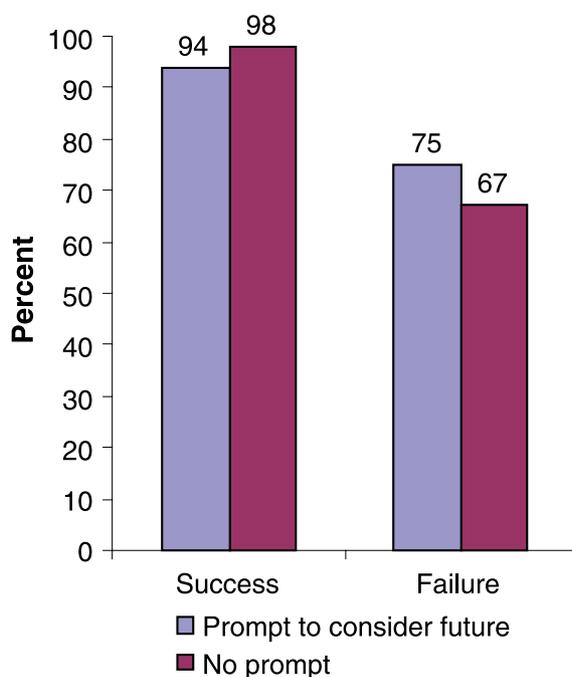


Fig. 2. Effects of outcome feedback and prompt to consider future success probabilities on the percentage choosing to return to the original broker (Study 2).

future ( $B=-1.72$ , Wald=3.99,  $p<.05$ ). In the success conditions, over 90% of participants in both the prompt and no-prompt conditions said they would choose the same broker again (94.2% of the participants who were prompted to consider future success probabilities said they would choose the same broker again and 98.4% of the participants who were not prompted to consider future success probabilities said they would choose the same broker again,  $\chi^2(1)=2.97$ , *ns*). Among those who received failure feedback, 75% of the participants who were prompted to consider future success probabilities stayed with the initial broker and 67% of the participants who were not prompted to consider future success probabilities stayed with the initial broker ( $\chi^2(1)=2.09$ , *ns*). The nonsignificant pattern in the predicted direction in the failure condition indicates that the prompt to consider the future certainly did not increase switching, although it did not significantly attenuate switching, either. That said, the significant interaction suggests that the impact of the prompt to consider the future differed in the two conditions, such that the prompt tended to diminish switching in the failure-feedback conditions, as predicted.

As in Study 1, a series of analyses were performed to test whether regret mediated the impact of outcomes on switching in this study. As noted above, results indicated that outcome (i.e., success vs. failure) predicted how likely participants were to switch, and outcome predicted reported regret ( $B=3.24$ ,  $t=24.71$ ,  $p<.0001$ ); when both outcome and regret were entered simultaneously into the regression equation, regret continued to be a significant predictor ( $B=-.43$ , Wald=25.53,  $p<.0001$ ) and the outcome effect continued to reach significance ( $B=1.04$ , Wald=5.50,  $p<.05$ ). A Sobel test indicated that the direct effect of outcome was significantly attenuated when regret was simultaneously entered into the model ( $Z=-.493$ ,  $p<.0001$ ); therefore, regret was a significant mediator of the impact of outcomes on switching behavior.

#### Estimates of future likelihood of success

As in Study 1, participants with brokers who were successful expected a higher likelihood of future success from that initially chosen broker ( $M=54.86$ ) than those participants whose brokers were unsuccessful ( $M=50.95$ ),  $F(1,475)=21.38$ ,  $p<.0001$ . Recall that participants in both the prompt and no-prompt conditions reported their expectations about the future success rates of the two brokers over the course of the study: those in the prompt condition provided these estimates before choosing whether to stay or switch brokers and those in the no-prompt condition reported these estimates only at the end of the study, after they had indicated their choice for the next occasion. A separate ANOVA tested for effects of decision outcome and timing of giving the estimates on expectations of future success of the

initially unchosen broker. An unpredicted effect of timing was obtained, indicating that participants who made their estimates prior to making their decision for the second occasion estimated a greater likelihood of success ( $M=46.33$ ) for the initially unchosen broker than did those who made their estimates after the decision ( $M=44.49$ ),  $F(1, 473)=6.16$ ,  $p<.05$ . However, this enhanced rating of the unchosen option does not explain obtained patterns of switching, because if anything this should increase switching in the condition in which people estimated future success rates before making their second decision, contrary to our obtained effect.

A repeated-measures ANOVA was conducted to examine whether participants estimated the future likelihood of success of the initially chosen broker to differ from that of the initially unchosen broker, and whether this varied as a function of whether participants chose to switch brokers or stay with the initial broker. As in Study 1, a main effect of the repeated-factor emerged, indicating that participants expected the initially chosen broker ( $M=52.99$ ) to outperform the initially unchosen broker ( $M=45.23$ ) in the future,  $F(1,474)=62.48$ ,  $p<.0001$ . However, a significant interaction effect also emerged,  $F(1,474)=59.46$ ,  $p<.0001$ , indicating a different pattern between those who switched brokers and those who did not. As in Study 1, those who stayed with the initial broker expected a higher success rate for the initially chosen option than the initially unchosen option ( $M_s=54.08$  vs.  $45.01$ ,  $t(395)=23.37$ ,  $p<.0001$ ). Among those who switched, participants estimated on average a success rate of  $47.60$  for the initially chosen option vs.  $47.49$  for the initially unchosen option,  $t(79)=.07$ , *ns*.

However, a closer examination of the data among the switchers indicates that many of them expected that the option to which they were switching was less likely to succeed in the future than the option from which they switched. When asked to make their decisions *before* reporting the estimated future success rates (i.e., those in the no-prompt condition), a majority (63%) of the participants who switched expected the future success rate to be lower for the broker to whom they were switching. When asked to make their decisions *after* reporting the estimated future success rates (i.e., those in the prompt condition), a smaller percentage (38%) of those who switched expected the future success rate to be lower for the broker to whom they were switching. Therefore, more people switched to the option expected to perform worse in the future in the no-prompt condition than in the prompt condition,  $\chi^2(1)=4.98$ ,  $p<.05$ . However, the second percentage (38%) indicates that some participants in this study switched to the originally unchosen broker even after having just reported a belief that the originally unchosen broker was less likely to succeed in the future than the originally chosen broker. Whereas many appear to switch because they are not thinking about future success rates, some switch even when the

future is salient and they expect the initially chosen option to outperform the option to which they are switching.

### Discussion

As in Study 1, participants in Study 2 indicated that they would feel regret about a good decision that resulted in a bad outcome. Prompting individuals to focus on the future probabilities of success of the two options before making a second decision somewhat reduced their likelihood of switching to a broker they thought would perform worse in the future. However, a number of participants in this study switched even after reporting that they expected the initially chosen broker to outperform the initially unchosen one in the future. In the absence of this prompt, many individuals chose to switch even though they later reported that they expected the initially chosen broker to be more successful in the future than the initially unchosen broker. This suggests that some individuals allow the negative affect that results from the bad outcome to weigh more heavily in their future decisions than beliefs about how to maximize their payoffs.

### Study 3

The third study is designed to manipulate experimentally whether individuals are focusing on affect or cognitions following the first decision in order to provide additional evidence that a focus on affect promotes switching and that a focus on cognitions can attenuate it. The results of Study 2 suggested that switching can be attenuated (although clearly not eliminated) among individuals who experienced an unfavorable outcome but think about future success rates before making their second decision. If individuals think more generally about the overall structure of the choice task (i.e., that even the overall better choice sometimes results in an unfavorable outcome and it is sensible to stick with the overall better option), will switching be attenuated further? To test whether individuals will be more likely to stay with the original broker if they focus on cognitions about the investment context rather than affect, Study 3 included a manipulation of the type of thinking in which individuals were asked to engage immediately prior to making their second decision: some participants were prompted to focus on their feelings before making a second decision whereas others were prompted to focus on their beliefs about the likelihood that an overall better decision in this context will sometimes produce a disappointing outcome. We predicted that the salience of affect and subsequent switching would therefore be diminished among those prompted to focus on their cognitions relative to those prompted to focus on their

emotional reactions. Further, including a control condition in which participants were not prompted to think either about their emotions or their cognitions would allow us to test the hypothesis that the default is to focus on affect.

### Method

#### Participants and design

Two hundred four participants completed an investment task as part of an hour-long study for credit in an introductory marketing course. This study employed a three-cell (affect-focus, cognition-focus, vs. control) between-participants design.

#### Procedure

All participants first were asked to complete the same brokers decision used in the first two studies. After making their choice, participants were handed a separate packet of materials containing outcome feedback as well as follow-up questions. In this study, all participants were told that their chosen broker failed to meet their investment objectives (i.e., lost 15% of the investment's value).

Participants were randomly assigned to think next about feelings, cognitions, or to proceed directly to a second investment decision. Participants in the affect condition were asked to report how pleased, upset, and disappointed they felt upon hearing about their investment outcome. In place of these affect-related questions, participants in the cognitions condition were asked to what extent they thought that unforeseeable market forces can impact investment outcomes, that a broker who has a good track record sometimes fails to meet financial objectives, and that they made a sensible decision given the overall success histories of the two brokers. Participants in the control condition were not presented with either the affect or cognitions-related questions prior to making a second decision.

Finally, all participants were asked which of the two brokers they would choose the next time they had \$5000 to invest. All participants then were asked how successful each broker was prior to investing their money and how likely they thought it was that each broker would be successful in the future if they selected that person to invest their money.

### Results

Nine participants chose the worse-performing broker initially; these nine participants were excluded from the analyses that follow.

#### Choice on subsequent decision

As shown in Fig. 3, 55% of participants in the control condition, 47% in the affect condition, and 83% in the

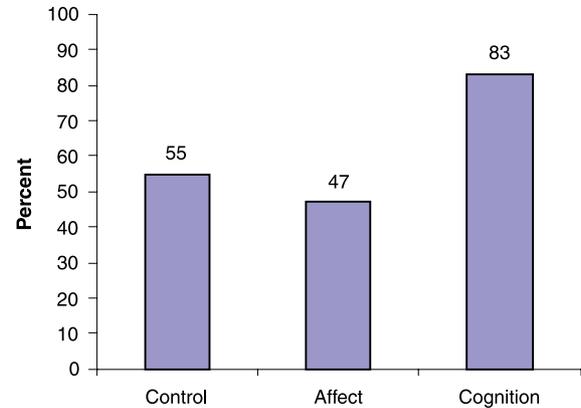


Fig. 3. Effects of focus on affect versus cognitions on the percentage choosing to return to the original broker following a negative outcome (Study 3).

cognitions condition chose to return to the initially selected broker. A logistic regression analysis revealed a significant effect of condition on switching ( $\chi^2(2) = 23.44, p < .0001$ ). Analyses indicate that whereas the difference between the proportions switching in the control and affect conditions was not significant ( $\chi^2(1) = .71, ns$ ), both of these conditions revealed significantly greater switching rates than the cognitions condition ( $\chi^2(1) = 12.44$  for the control versus cognitions condition and  $\chi^2(1) = 20.66$  for the affect versus cognitions condition,  $ps < .01$ ).

### Discussion

The results of Study 3 provide additional support for the hypothesis that participants who learn that their chosen option produced an undesirable outcome feel compelled to switch away from that option based on the feelings aroused by the outcome rather than beliefs about the investment context. As one participant noted in an open-ended account of the decision to switch brokers, "This wouldn't make sense to do statistically, but I would probably allow my emotions toward B [to] affect my decision in leaning toward Broker A." Although many participants appear to allow their emotions to overrule their beliefs about what is optimal behavior in this situation, the results of Study 3 indicate that switching was significantly lower among individuals prompted to focus on their beliefs about the investment situation rather than their feelings about the earlier outcome. These results therefore replicate and extend the finding of Study 2 that a focus on cognitions about the choice task can attenuate individuals' focus on their negative emotional responses to the disappointing previous outcome. Further, the similar levels of switching in the control and affect conditions are consistent with the idea that focusing on affect is the default.

## Study 4

Study 4 had three primary objectives. The first objective was to test whether an individual difference in the extent to which people engage in thoughtful deliberation would predict the extent to which people switch away from a good decision that had a bad outcome. The results of Studies 2 and 3 suggested that a focus on task-related cognitions can short-circuit the desire to abandon good options that had failed the participant on the previous occasion. However, we sought to determine whether this result would replicate when the operationalization of cognitions-focus was more general and subtle than the items used to induce a focus on cognitions in Studies 2 and 3. In Study 4, we hypothesized that individuals with a greater tendency to engage in cognitive processing (i.e., those high in need for cognition, Cacioppo & Petty, 1982) would be less surprised and feel less regret when a favored option with a considerable probability of failure produced a negative result. We expected that individuals high in need for cognition would therefore be more willing to return to the higher success-rate option following a disappointing outcome than would those low in need for cognition. Such findings would be consistent with the tendency of those who engage in less cognitive processing to base decision more on affective reactions (Shiv & Fedorikhin, 2002).

In addition, Study 4 examined two alternative explanations for the switching observed in the preceding experiments. It is possible that participants switched away from the broker who failed on the first occasion in part because they perceived that the broker's performance was on a downward trend. Indeed, the failure outcome led participants in the earlier studies to lower their estimates of the future success likelihood of the originally chosen broker. Individuals' perception of a downward trend might have produced a negative reaction (Loewenstein & Prelec, 1993) and unwillingness to choose that option again, despite individuals' belief that the originally chosen alternative would outperform the unchosen alternative on a second trial. For this reason, Study 4 included a no-trend condition designed to counter participants' belief that a single outcome may reflect a trend. If individuals' switching behavior is guided by the negative reactions to a possible downward trend, then making a trend seem unlikely should attenuate switching. We hypothesized that the no-trend manipulation would not eliminate switching because our earlier results suggest that participants' desire to switch stems from a negative emotional response to the preceding outcome distinct from their beliefs about success rates on future occasions.

Another possible explanation for the switching behavior observed in the preceding experiments is that individuals desire to punish a person who initially failed them. For this reason, we included a condition in Study 4

in which participants were asked to choose between two classes of investments offered by a single broker, rather than investments offered by two different brokers. We expected that the earlier results were not due to a desire to punish the broker and that similar levels of switching would be obtained in this one-broker condition as in the two-broker control condition.

## Method

### Participants and design

One hundred forty-eight undergraduate students completed a 15-min study to fulfill course credit. The study employed a 2 (need for cognition: low vs. high)  $\times$  3 (condition: control, no trend, vs. one broker) between-participants design.

### Procedure

All participants were presented with a broker scenario, similar to the one used in the previous studies. We specified that success is reflected by an increase of 12% or more and that Broker A (or Class of Investments A) had a 45% history of success and a 55% history of failure, whereas Broker B (or Class of Investments B) had a 55% history of success and a 45% history of failure.<sup>6</sup>

Participants in the control condition chose one of these two brokers, as in the preceding experiments. Before making their initial choice, participants in the no-trend condition read that no detectable upward or downward trend had been observed in the brokers' performance over time. Participants in the one-broker condition read about two classes of investments rather than two brokers (i.e., one class of investments [Class A] offered by a particular broker had a 45% history of success and a 55% history of failure, whereas the second class of investments [Class B] offered by the same broker had a 55% history of success and a 45% history of failure).

After making their initial choice between these two brokers or classes of investments, participants received the feedback that their investment had lost 15% of its value. Participants were then asked which alternative they would choose next time, how strong their preference would be (e.g., 1 = *strongly prefer Broker A*, 6 = *strongly prefer Broker B*), how surprised they were by the outcome, and to what extent they regretted the decision they made and wished they had chosen the other broker or class of investments. In addition, participants were asked to recall the prior success rates for both the

<sup>6</sup> We decreased the operational definition of success to a 12% increase to appear more attainable in the struggling stock market when the study was conducted. The success percentages were designed to be multiples of five in this study so that we could include an experimental condition that is not germane to the hypotheses included in this paper and is therefore not described here.

alternative they initially chose and the one they initially did not choose, as well as to indicate how successful they thought the initially chosen and unchosen alternatives would be in the future. Finally, participants indicated to what extent they made a sensible decision and to what extent their first outcome indicates either an upward or downward trend. Participants in the control and no-trend conditions completed these items with reference to the two brokers; participants in the one-broker condition completed these items with reference to the single broker with two classes of investments. All participants also completed the Need for Cognition Scale (Cacioppo & Petty, 1982).

### Results

Participants were classified as high versus low need for cognition based on a median split of their need for cognition scores (median = 19; those with scores of 18 or below were classified as low need for cognition, those with scores of 20 or higher were classified as high need for cognition, and those with scores of 19 ( $n=5$ ) were excluded from the analyses reported below). The few participants ( $n=3$ ) who selected the worse option (i.e., the 45% success alternative) in the first trial also were excluded from these analyses.

#### Ratings of initial decision

ANOVAs were performed to test for effects of condition and need for cognition on participants' responses to the outcome information. A significant main effect of need for cognition emerged on the item assessing how surprised participants were about the outcome. As predicted, the low need for cognition participants expressed greater surprise about the outcome ( $M=4.56$ ) than did the high need for cognition participants ( $M=4.12$ ),  $F(1, 134)=4.04$ ,  $p<.05$ ; no effects or interactions with condition were obtained on this measure,  $F_s<1$ . The regret and wish chose other broker items were positively correlated ( $r=.58$ ) and were averaged as before. The predicted effect of need for cognition emerged on this composite score: the low need for cognition participants reported feeling more regretful ( $M=4.72$ ) than did the high need for cognition participants ( $M=4.04$ ),  $F(1, 134)=7.31$ ,  $p<.01$ . High need for cognition participants also rated their initial decision as having been more sensible ( $M=5.59$ ) than did the low need for cognition participants ( $M=5.00$ ),  $F(1, 134)=9.23$ ,  $p<.01$ . There was also a trend for low need for cognition participants to rate their decision as less "good" than did high need for cognition participants ( $M_s=3.58$  vs. 4.04),  $F(1, 134)=3.13$ ,  $p<.10$ .<sup>7</sup>

<sup>7</sup> In this study the correlation was weak between how sensible and good the decision was perceived to be ( $r=.12$ ,  $p=.15$ ), and for this reason we present the results of the two measures separately.

The only item for which a significant effect of condition was obtained was the question assessing perceptions of a trend,  $F(2, 134)=4.12$ ,  $p<.05$ . Participants in the "no detectable trend" condition rated the outcome as less likely to convey a trend ( $M=3.47$ ) than did participants in the control condition ( $M_s=4.20$ ) and the one-broker condition ( $M=4.32$ ),  $p_s<.05$ ; these latter two conditions did not differ from each other.

#### Choice on subsequent occasion

A logistic regression analysis was performed to test for the effects of condition and need for cognition on participants' choice on the subsequent decision. Consistent with predictions, whereas 75% of the high need for cognition participants chose to return to the initially chosen option, only 48% of the low need for cognition participants chose to do so ( $B=-1.34$ , Wald=11.99,  $p=.001$ ).<sup>8</sup> No main effect of condition emerged (Wald=1.99,  $p=.37$ ): 63% of participants in the control condition, 58% of participants in the no-trend condition, and 64% of participants in the one-broker condition said they would return to the initially chosen option. Therefore, switching was not attenuated when the outcome was perceived as less likely to signal a downward trend, nor was switching attenuated when individuals were choosing between two classes of investments as opposed to between two brokers. As a next step, we examined whether the Condition  $\times$  Need for Cognition interaction was significant; as expected, no interaction effect emerged (Wald=1.60,  $p=.45$ ).

A similar pattern of results was obtained on the participants' ratings of their preferences between the two brokers. A significant effect of need for cognition was obtained, indicating that the high need for cognition participants reported a greater preference to return to the originally chosen broker than did those low in need for cognition ( $M_s=4.35$  vs. 3.68,  $F(1, 134)=10.62$ ,  $p=.001$ ). No main effect of experimental condition or interaction with condition emerged on this strength of preference measure ( $M_s=3.92$ , 4.00, and 4.11 in the control, no-trend, and one-broker conditions, respectively),  $F_s<1$ .

#### Recalled priors and estimates of future likelihood of success

There were no effects of experimental condition or need for cognition on the recalled priors for the chosen and unchosen brokers,  $p_s>.30$ . An unexpected trend was obtained for high need for cognition participants to give higher future success likelihood estimates than did low need for cognition participants for both the initially chosen broker,  $F(1, 133)=3.67$ ,  $p=.06$ , and the initially

<sup>8</sup> The same pattern emerges if we use the need for cognition scores themselves rather than a median split to predict switching behavior ( $B=.045$ , Wald=15.59,  $p<.0001$ ).

unchosen broker,  $F(1, 131) = 3.06, p = .08$  ( $M_s = 53.93$  vs.  $50.27$  for the ratings of the initially chosen broker;  $M_s = 48.12$  vs.  $44.90$  for ratings of the initially unchosen broker).<sup>9</sup> However, as in the preceding experiments, participants expected the initially chosen option to outperform the initially unchosen option ( $M_s = 52.56$  for the initially chosen option vs.  $46.47$  for the initially unchosen option),  $F(1, 131) = 24.05, p < .0001$ , and the magnitude of this effect did not vary between experimental conditions or between low versus high need for cognition participants,  $p_s > .30$ . Collapsing across need for cognition, 47% (9 out of 19) of the switchers in the control condition, 42% (8 out of 19) of the switchers in the no-trend condition, and 53% (9 out of 17) of the switchers in the one-broker condition thought that the initially chosen option would outperform the initially-unchosen option in the future; a logistic regression analysis indicated that these percentages do not differ between conditions (Wald = .42, *ns*). Therefore, a sizable percentage of participants in all conditions who switched away from their initial choice did so despite believing that the option from which they switched had a higher likelihood of future success than the option to which they switched.

### Discussion

The results of Study 4 replicate and extend the results of the preceding studies in several ways. First, the results of Study 4 indicate that an individual difference in cognitive focus (i.e., Cacioppo & Petty's, 1982 need for cognition) has a significant impact on individuals' willingness to stick with the better choice alternative. This indicates that the diminished switching observed in the cognitions-focus condition of Study 3 generalizes to chronic, less task-specific operationalizations of attention to cognitions. Whereas a focus on affect appears to lead individuals to switch away from a good option that had a bad outcome, a focus on cognitions can attenuate this switching behavior.

In addition, Study 4 addressed two alternative explanations for the switching behavior observed in the preceding experiments. An experimental manipulation that reduced participants' belief that a single outcome reflects a downward trend did not reduce switching. However, it is worth noting that the no-trend manipulation diminished but did not eliminate participants' belief that a single outcome could reflect a trend. It is possible that switching might be completely eliminated when people are certain that the probabilities are unchanging. A follow-up analysis to investigate this idea suggests that even when people think that there is no possibility of a

downward trend, some people still choose to switch away from their initially chosen option: in Study 4, two of the six participants who thought there was no possibility of a downward trend (i.e., who gave a rating of "1" to the question about a trend) said they would switch to the other broker.

Finally, the results of Study 4 indicate that similar levels of switching are obtained when individuals are asked to choose between two classes of investments as when they are asked to choose between two brokers. This result suggests that the switching evident in Studies 1–3 was not driven by a desire to punish the broker who lost money on the first investment occasion.

### General discussion

These four studies demonstrate that individuals feel regret when they choose a probabilistically favored option and the outcome is unfavorable. As a result, they are less willing to choose that decision option again in the future, even when they believe that the option is more likely than the alternatives to produce a successful outcome. Study 1 demonstrated that regret leads participants to switch away from an initial good decision that had a bad outcome, even though they indicated after the second decision that they expected the initially chosen option to outperform the initially unchosen option in the future. In Study 2, the tendency to switch away from good decisions that had bad outcomes was attenuated (directionally) but not eliminated when participants were prompted to report future success likelihoods for both choice alternatives before making their second decision. Study 3 demonstrated that individuals prompted to focus on their emotional reactions behaved similarly to those in a control condition, and switched more than those prompted to think about their beliefs about the investment context. In Study 4, this pattern was replicated with a measure of chronic focus on cognitions: individuals high in need for cognition stayed with the initial probabilistically favored broker significantly more than those low in need for cognition. Together, these results strongly suggest that emotional reactions following an unfavorable outcome sometimes lead people to abandon the decision that they think is more likely to produce a successful outcome on the next occasion.

The present findings provide evidence that although regret is often an adaptive emotion that helps individuals to learn from their mistakes, in some cases, regret leads people away from the best options (Zeelenberg, 1999; Zeelenberg et al., 2001). These results add to a growing literature on cases in which emotions dominate when reason and emotions are at odds with each other (e.g., Loewenstein, 1996; Shiv & Fedorikhin, 1999). However, consistent with the notion that the role of affect can be attenuated when cognitions are more

<sup>9</sup> One participant did not indicate a future success likelihood for either the initially chosen or unchosen broker, and two other participants did not indicate a future success likelihood for the initially unchosen broker.

salient (Shiv & Fedorikhin, 1999), we find that factors that encourage individuals to focus on their beliefs about the choice task (e.g., the extent to which even good decisions sometimes have bad outcomes) appear to increase their willingness to return to the better option.

These results are consistent with recent findings showing that patients who have brain lesions inhibiting the experience of emotions (e.g., in regions such as the orbitofrontal cortex) make decisions based more on maximizing expected utility than do non-patients. For example, in one study such patients were more likely than non-patients to invest in a gamble that had a higher expected value than abstaining from the gamble; as a result, the patients made more money than did non-patients across the repeated trials in the study (Shiv, Loewenstein, Bechara, Damasio, & Damasio, *forthcoming*). Another study indicated that patients with lesions in the orbitofrontal cortex did not experience regret following feedback on the outcome of their chosen gambles; as a result, the patients were more likely than non-patients to choose the higher-expected value gamble (which had a lower probability of success; Camille et al., 2004). Those who anticipated regret (i.e., the non-patients) appeared to base their decision on the possible counterfactuals that they would generate if they failed to win money on a trial and as a result chose the less risky option (i.e., the lower-expected value gamble that had a higher probability of success). Our results therefore converge nicely with recent evidence from neuroscience research that emotional reactions can lead people away from the higher-expected value option, although in our case, we find that the experience of regret sometimes leads people to choose a lower-expected value option that has a *lower* probability of success than the alternative (i.e., emotions not only lead people to choose a lower-expected value option that is less risky; they may even shift to choosing a lower-expected value option that has a lower likelihood of success).

These results suggest a number of avenues for future research. Factors that dampen the impact of individuals' emotional reactions to the initial event should attenuate switching to the lower probability of success options. For example, switching could be attenuated when individuals are asked to consider what decision they would make on a subsequent occasion before receiving feedback about the initial decision. Considering the second decision before the negative affect is aroused from the first decision might encourage people to base their decisions on the probabilities of success rather than the emotional reactions to different outcomes. Similarly, a time delay between the initial outcome and the subsequent decisions could reduce the impact of emotional reactions to the initial outcome. Learning that the initially unchosen option also produced an unfavorable outcome on the initial trial could also attenuate feelings of regret and

therefore switching behavior. Another possibility is that individuals' switching behavior would be attenuated if they had many trials of experience with the chosen option before a negative outcome was obtained; perhaps a favorable history would buffer individuals from the negative affect associated with a single unsuccessful outcome.

An interesting question is whether individuals perceive that there are defensible reasons (Inman & Zeelenberg, 2002) to switch away from the good decision that had a bad outcome or whether they recognize that switching is hard to justify. An accountability manipulation might reduce switching rates if individuals perceive that the rational decision is to stay with the initial good option. However, we suspect that an accountability manipulation will not completely eliminate switching away from best options, as affect may still be strongly negative and individuals may believe that others will share their negative emotional reactions.

It is worth noting that in the present studies, there was no version of the broker-selection task in which switching was completely eliminated following a negative outcome. However, in a separate study (Ratner & Herbst, 2004) in which we asked people which urn they would choose—one containing 54% winning balls and another containing only 43% of the winning color—all participants said they would select again from the urn containing the higher percentage of winning balls even after an initial occasion on which that urn did not produce a winning ball. We suspect that the elimination of switching in that context was due in part to people's greater tendency to reason statistically when chance factors are salient (Nisbett, Krantz, Jepson, & Kunda, 1983); it is likely that the role of chance looms larger in a game consisting of draws from an urn than a situation in which the outcome is the success of an agent's investment decision.

## Conclusion

Our findings suggest that emotion plays an important role in leading people to abandon overall better options following a negative outcome with that option. In fact, a majority of the participants in our studies who switched did so despite believing that the alternative to which they were switching was less likely to produce a successful outcome. Therefore, whereas previous research focuses on the adaptive nature of regret, our findings suggest that the negative affect produced by a bad outcome of a good decision can induce people to switch away from the option most likely to succeed in the future. Regret in this case has an unfortunate consequence: individuals who focus on the negative affect generated by the earlier outcome are even more likely to generate an unfavorable outcome on the subsequent choice occasion.

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