Bias at the Racetrack: Effects of Individual Expertise and Task Importance on Predecision Reevaluation of Alternatives

Aaron L. Brownstein
Stephen J. Read
Dan Simon
University of Southern California

These studies were designed to test cognitive dissonance theory's assertion that alternatives are not reevaluated before a choice. Participants viewed information about horses in a simulated race and rated each one's chance of winning three times before placing their bet and once after placing it. It was found that ratings of the chosen horse increased within the predecision period as well as after betting. Predecision bolstering occurred even when participants did not expect to bet, and predecision preference increased with task importance and participant expertise. The findings are attributed to maintenance of consistency throughout a cognitive system.

Keywords: *decision; expertise; decision consequences; dissonance; anticipated regret; constraint satisfaction*

Cognitive dissonance theory suggests that after making a decision people spread evaluations of their chosen and nonchosen alternatives apart, increasing the perceived relative advantage of the chosen alternative (Festinger, 1957, 1964). Postdecision reevaluation of alternatives has been reported in several studies (Brehm, 1956; Festinger, 1964; Gerard & White, 1983), including one concerning the choice of which horse to bet on in a race (Knox & Inkster, 1968). Knox and Inkster (1968) asked bettors at a racetrack to rate the chance that the horse they bet on would win the race and found that bettors who had just placed a win-bet gave more optimistic estimates of the chance that their horse would win than bettors who were about to place a win-bet, suggesting that they bolstered their chosen alternative after making their decision.

The question of whether decision makers also restructure their mental representation of the decision environment to favor one alternative before making a choice has been controversial, and the specific question whether such biased predecision processing affects probability estimates has not been addressed empirically (Brownstein, 2003). Some theories of decision making suggest that a promising alternative is differentiated before being chosen (e.g., Montgomery, 1983; Svenson, 1992), but dissonance theory maintains that the predecision phase is characterized by an "absence of any systematic, biasing re-evaluation of alternatives" (Festinger, 1964, p. 153) and rational choice requires estimates of probabilities associated with alternatives to be stable over time and independent of the expected values of alternatives (Hogarth, 1987; von Neumann & Morgenstern, 1944).

The present research tested whether estimates of the chosen horse's chance of winning increase relative to estimates of the nonchosen horses' chances of winning within the predecision phase. Participants viewed information about four horses competing in a simulated race and rated the chance three separate times each horse had of winning before betting on one to win and then again after betting. We expected to replicate Knox and Inkster's finding that estimates of the chosen horse's

Authors' Note: This research was supported by National Science Foundation Grant SES-0080424. We thank Darren Urada of ParticipantsOnline.com for administering these studies, which contributed to the first author's dissertation. Correspondence concerning this article should be addressed to Aaron Brownstein, Department of Psychology, SGM 501, University of Southern California, Los Angeles, CA 90089-1061; e-mail: aaronb@usc.edu.

PSPB, Vol. 30 No. 7, July 2004 891-904
DOI: 10.1177/0146167204264083

chance increase after the bet is placed, and we also expected to find that probability estimates associated with the chosen and nonchosen horses spread apart before the bet is placed.

Previous research has shown that prolonged thought or repeated expression causes attitudes toward various issues to polarize (Judd & Brauer, 1995; Tesser, 1978). However, the present research goes beyond showing that general attitudes tend to spread apart from each other to look at whether the process of making a decision involves the spreading apart of the ultimately chosen alternative from the nonchosen alternatives.

Expertise

Previous research has not tested the effects of domain specific expertise on predecision reevaluation of alternatives (Brownstein, 2003). However, research has found that individuals with greater expertise have more polarized attitudes and that their attitudes polarize more over time than individuals with lesser expertise (assuming correlated attributes; Lusk & Judd, 1988; Millar & Tesser, 1986). We thought that if experts generally have more polarized attitudes they also might develop stronger preferences during decision making. Therefore, we predicted that individuals who have greater expertise with horse racing would spread probability estimates of their chosen and nonchosen horses apart to a greater extent so that their preference for their chosen horse would emerge earlier and increase at a faster rate within the predecision phase than individuals with lesser expertise.

Task Importance

Previous research has investigated the effects of task importance on predecision reevaluation of alternatives, but the findings have been inconsistent (Brownstein, 2003). Research has found that people are more likely to reevaluate their alternatives in favor of the one they eventually choose if they expect to make a choice than if they do not expect to make a choice (e.g., O'Neal, 1971; O'Neal & Mills, 1969). It might then seem likely that further increasing the importance of the task by asking participants to make decisions involving more important consequences would further increase predecision reevaluation of alternatives. Indeed, two experiments based on choice certainty theory did find that increasing the importance of the consequences associated with a decision increased predecision reevaluation of alternatives (Mills & Ford, 1995; O'Neal, 1971). However, a third experiment found the opposite, that increasing consequences of a decision decreased reevaluation of alternatives (Tyszka, 1998).

It is not clear why Tyszka's results are different from those of the choice certainty experiments, but one possibility is that the effects of decision importance may depend on the valence of the consequences of the decision because in the choice certainty experiments participants made decisions involving moderately negative consequences, whereas in Tyszka's experiment they made decisions involving moderately positive consequences. In our horse race paradigm, participants do not risk losing their own money, so the decision of which horse to bet on can be considered to involve the pursuit of positive consequences, such as the satisfaction of choosing a winner or a monetary payoff. Therefore, our research provided a new opportunity to test the effects of positive consequences on predecision reevaluation of alternatives.

In the present research, participants gave repeated predecision probability estimates for the horses in the race under different conditions of task importance, such as not expecting to make a decision, expecting to make a nonconsequential decision, or expecting to make a decision involving potential positive consequences. We predicted that participants in conditions of greater task importance would spread evaluations of their alternatives apart to a greater extent so that participants who expected to make a nonconsequential decision would reevaluate their alternatives to a greater extent than participants who did not expect to make a decision and participants who expected to make a consequential decision would reevaluate their alternatives to a greater extent than participants who expected to make a nonconsequential decision. However, if Tyszka's findings mean that the effects of decision importance depend on the valence of the consequences, participants who expected to make a consequential decision would reevaluate their alternatives to a lesser extent than participants who expected to make a nonconsequential decision.

STUDY 1

Overview and Predictions

Participants viewed information about four horses about to compete in a simulated race and rated the chance each horse had of winning the race three separate times before betting on one of the horses to win the race and once again following the placing of the bet. We predicted that participants would spread probability estimates associated with their chosen and nonchosen alternatives apart, giving their chosen horse a progressively greater advantage over their nonchosen horses.

To test the effects of individual expertise on predecision reevaluation of alternatives, we recruited participants with different degrees of experience betting on horse races. We predicted that participants with greater expertise would spread evaluations of their alternatives

apart to a greater extent than would participants with lesser expertise.

To test the effects of task importance on predecision reevaluation of alternatives, we randomly assigned participants to one of three conditions. The decision/consequences condition most closely resembled a real horse race because participants expected to bet on a simulated race that had tangible consequences (if they won the race, they would receive extra tickets in a lottery). In the decision/no-consequences condition, participants expected to make a decision (bet on a horse in the race) but they did not expect any consequences from their decision (they did not even expect to be told of an outcome). In the no-decision condition, participants rated the horses three times without expecting to place a bet at all. We predicted that increasing task importance by giving participants the expectation of making a choice would increase predecision reevaluation of alternatives so that participants in the decision/no-consequences condition would spread evaluations of their alternatives apart to a greater extent than participants in the no-decision condition. We also predicted that further increasing task importance by introducing positive consequences associated with the choice would further increase predecision reevaluation of alternatives so that participants in the decision/consequences condition would spread evaluations of their alternatives apart to a greater extent than would participants in the decision/no-consequences condition.

Methods

PARTICIPANTS

This study was conducted on a Web site for psychology experiments. We obtained 152 usable data sets from the Web site's mailing list. To obtain a sample of experienced horse players, we advertised on a Web site featuring news and discussions of real horse races and obtained another 139 usable data sets.

MATERIALS AND PROCEDURE

An introductory page invited people to participate in a two-part study, explaining that participants who completed the first part of the study were guaranteed one entry in a lottery for a $200 cash prize and participants who completed the second part of the study would have an opportunity to earn additional entries in the same $200 lottery.

On the first page of the study, participants were presented information charts about four racehorses, described as the racing form for an imaginary race. There were four charts for each horse: one chart displayed the horse's profile (color, sex, age, drugs, weight, odds, payoff); a second chart summarized its jockey's overall and recent performance (wins, places, shows, percentage wins); a third chart summarized the horse's performance overall, in the last 2 years, and at specific racetracks (wins, places, shows, earnings, speed); and a fourth chart displayed its performances in five recent races (date; track's location, condition, length; horse's speed, position, margin, drugs, weight, jockey; number in race). Participants could view explanations of the information in most columns by clicking on the column header. The order of the charts for each horse, and the order of presentation of horses, was the same for all participants.

Dependent measures were four questions asking each horse's chance of winning the race. The questions were customized for each horse (e.g., What chance does Radiance have of winning the race?). Responses were made using a 15-point radio button scale anchored at *slight* (1), *moderate* (8), and *excellent* (15). Participants could change their ratings while on this page.

After participants made their ratings (baseline ratings [base]), they clicked a continue button to go to the next page. Throughout the experiment, participants clicked continue to advance to the next page and then were unable to return to the previous pages.

On the next page, participants were thanked for their participation in the first part of the study, assured that they had one ticket in the $200 lottery, and were invited to participate in the second part of the study. From this point on, the instructions given to the three conditions differed.

DECISION/CONSEQUENCES CONDITION

Participants in the decision/consequences condition were told that a race was going to be run in a little while, were invited to place a bet on the race, and were informed that they would have something to gain from their decision:

> In the second part of this study, we will run a simulated horse race. If you choose to participate in the second part of the study, we will give you $2.00 in "virtual money" with which to bet on one of the horses to win the race. If you bet on the horse which wins the race, we will convert its "payoff" into extra lottery tickets (the "payoff" for each horse is listed in the information charts). Winnings will be rounded up to the nearest whole dollar (so a $4.60 payoff becomes 5 extra tickets). If you bet on a horse which doesn't win the race, you'll still have the single entry in the lottery which you received for participating in the first part of the study.

Similar to a real horse race, the odds and payoffs were based on the relative amounts bet on the horses in the race. For the simulation, we assumed a $100,000 betting

pool and decided that $42,000 had been bet on one horse (so its odds were 1.4 to 1 and its payoff for a $2.00 bet was $4.80), $29,000 was bet on a second (2.5:1, $7.00), $18,000 was bet on a third (4.6:1, $11.20) and $11,000 was bet on a fourth (8.1:1, $18.20).

In the second part of the study, participants found information charts described as the racing form for the race they would bet on. The information in the charts was the same throughout both parts of the study but we changed the order of presentation of the horses and renamed them in the second part of the study to make the horses appear to be different from those presented in the first part of the study. This was intended to prevent participants from simply repeating their earlier ratings. The order of the charts for each horse, and the order of presentation of horses, was the same for all participants.

One concern in research such as ours is that participants might reach a private decision before placing a bet. To help prevent such premature decisions, the instructions explained that the charts contained only information that was "currently available" and that the information "may be changed or updated as new developments come in before the race" because "a horse may be injured, prompting the posting of a special notice or withdrawal of a horse from the race, a jockey may be replaced, and the odds may change as bets come in."

The instructions then asked participants to report their initial inclinations about the chance of each horse winning the race.

> As you study the available information you may find that you have formed some inclinations about the chances of each horse winning the race. We would like to know what these initial inclinations are. After having reviewed the information, please provide your initial ratings of the chance of each horse winning the race by clicking on one of the dots on each line. You can change your ratings by clicking a different dot.

Participants were assured that they would have plenty of time to place their bets once the information became final. The dependent measures were customized for each horse and appeared between the charts; participants responded using the 15-point scale.

After participants made their ratings (first prechoice ratings [pre-1]) and clicked continue they advanced to the next page, where they were asked to continue looking through the charts and again rate the chance each horse had of winning the race. As on the previous page, participants were warned that it was too early to reach a decision about their bet and assured that they would have plenty of time to place their bet when the information became final. The charts and dependent measures were the same as on the previous page.

After participants made their ratings (second prechoice ratings [pre-2]) and clicked continue, they advanced to the next page, where they were told that it was time to place their bets. They were informed that no new information was coming and were encouraged to review the charts before placing their bets. The charts that appeared on the page were the same as on the previous pages. Participants placed their bets by clicking a button next to the name of the horse they wanted to bet on and clicked continue to advance to the next page.

On the next page, participants were told that the betting windows were closed and the race would start momentarily. Then they were asked to review the charts again and rate the chance each horse had of winning. The charts and dependent measures were the same as on previous pages.

After participants made their ratings (postchoice ratings [post]) and clicked continue, they advanced to the next page. A computer program selected the order of the horses for each race, with each horse's chance of winning proportional to its odds in the charts. Participants were told the outcome of the race (which of the four horses came in first, second, third, and fourth) and given a customized summary of their own racing outcome ("You bet on _____, so your 'virtual payoff' would have been $_____ and you get _____ extra tickets in the lottery").

Participants clicked continue to advance to the next page, where they were asked to rate the extent of their experience with horse racing. One item asked how many times they had bet on a horse race prior to this experiment (*less than 5, 5-20 times, more than 20 times*). A second item asked how they would have described themselves with regard to betting on horses (*novice, know a little, know quite a lot, expert*).

Participants clicked continue to advance to the next page, where they viewed a debriefing statement and could e-mail the experimenters.

DECISION/NO-CONSEQUENCES CONDITION

The decision/no-consequences condition was identical to the decision/consequences condition, with the following exceptions.

The second part of the study was described in a way that led participants to believe that their decision would have no consequences:

> The second part of this study involves some more short tasks related to horse racing. If you choose to participate in the second part of this study, you will review another set of charts about four horses running in a simulated race, respond to questions about those horses, and choose the horse you would like to bet on, although you won't actually find out the results of the race.

To motivate participants to proceed to the second part of the study, we offered them a chance to obtain more tickets in the lottery, even though we did not want them to associate the chance with betting on the race. Therefore, the instructions continued, "After that, you will have an opportunity to participate in a game which is also related to horse racing, in which you may win additional tickets in our $200 lottery."

On the next two pages, where participants rated the horses (pre-1 and pre-2), the number of extra lottery tickets associated with each horse was omitted from the information charts.

On the third page, participants were asked to bet on the race. They were told for the first time that they would receive feedback on the results of the race and that if the horse they bet on won the race, they would obtain extra tickets in the lottery. The instructions explained that "this is the opportunity we promised you earlier to earn extra tickets in the lottery" and then explained how a winning horse's payoff would be converted into extra lottery tickets, using the explanation that was presented to participants in the decision/consequences condition. The instructions given at the postchoice rating were identical to those in the decision/consequences condition.

NO-DECISION CONDITION

The no-decision condition was identical to the decision/no-consequences condition, with the following exceptions.

The second part of the study was described in a way that led participants to believe that they would not be expected to make a decision at all:

> The second part of this study involves some more short tasks related to horse racing. If you choose to participate in the second part of this study, you will review another set of charts about four horses running in a simulated race and respond to questions about those horses.

On the next two pages, references to betting on the race were deleted. Thus, on the first page of the second part of the study, in the parts of the instructions that warned that the charts may be updated with new information, phrases advising participants to refrain from making a "decision about the bet" and promising that "you will later have as much time as you like to make your bet" were deleted. Similarly, on the next page, the parts of the instructions warning participants that it was "too early to make any decision about the bet" and assuring them that "you will later have as much time as you like to make your bet" were omitted. On the following page, participants were unexpectedly asked to bet on the race. They were told for the first time that they would bet on a horse and that if the horse they bet on won the race, they would obtain extra tickets in the lottery. The instructions given at the postchoice rating were identical to those in the decision/consequences condition.

Results

We predicted that participants would spread evaluations of their chosen and nonchosen alternatives apart within the predecision phase and again after placing their bets. We also predicted that participants with more experience betting on horse races would reevaluate their alternatives to a greater extent than participants with less experience and that participants would reevaluate their alternatives to a greater extent under conditions of greater task importance.

We obtained a bimodal distribution in expertise from our two sources of participants; participants obtained from the mailing list reported relatively little experience with betting on horse races and participants obtained from the advertisement reported more experience betting on horse races. Therefore, we created a dichotomous expertise variable, classifying participants as experts if they had bet on 20 or more races and described themselves as a seasoned expert or as knowing quite a lot about handicapping ($n = 123$, 93% from advertisement) and as nonexperts if they had bet on less than 20 races and described themselves as a novice or as knowing a little about handicapping ($n = 160$, 86% mailing list; 8 participants who could not be classified were excluded).

A 2 (chosen, nonchosen) × 4 (base, pre-1, pre-2, post) × 2(expert, nonexpert) × 3 (no-decision, decision/no-consequences, decision/consequences) ANOVA revealed a main effect of alternative, $F(1, 254) = 445.62$, $p < .001$, a main effect of time, $F(3, 762) = 38.15$, $p < .001$, and an Alternative × Time interaction, $F(3, 762) = 34.35$, $p < .001$. A linear trend of Alternative × Time interaction confirmed that evaluations of the chosen and nonchosen alternatives spread apart across time, $F(1, 254) = 80.57$, $p < .001$, and linear trends revealed that ratings of the chosen alternative increased across time, $F(1, 277) = 110.20$, $p < .001$, but ratings of the nonchosen alternatives did not change across time, $p < .7$. Paired comparisons confirmed that ratings of the chosen alternative increased significantly from base to pre-1, $t(279) = 4.52$, $p < .001$, increased marginally from pre-1 to pre-2, $t(280) = 1.66$, $p < .1$, and increased significantly from pre-2 to post, $t(280) = 7.01$, $p < .001$, but ratings of the nonchosen alternatives did not change significantly over time (Figure 1).

The linear trend of Alternative × Time × Expertise interaction was not significant, $p < .8$, suggesting that the extent to which ratings of the chosen alternative increased across time was not moderated by expertise, although linear trends confirmed that ratings of the chosen alternative increased among experts, $F(1, 119) =$

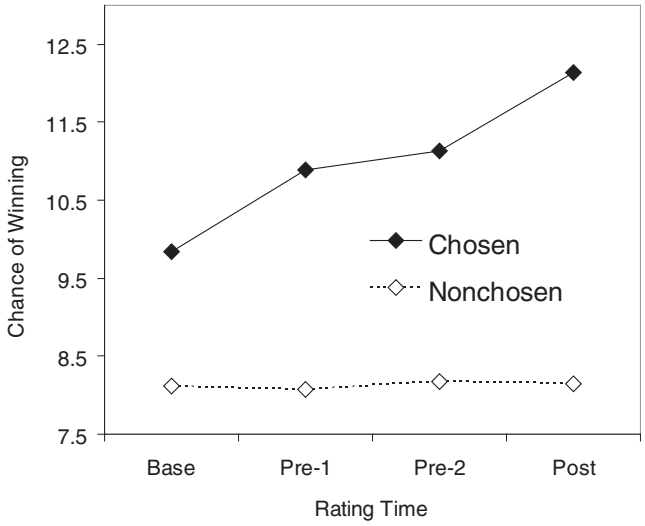

Figure 1 Ratings of chosen and nonchosen horses' chances of winning a race.
NOTE: Ratings were made at baseline (base), the first prechoice rating time (pre-1), the second prechoice rating time (pre-2), and the postchoice rating time (post).

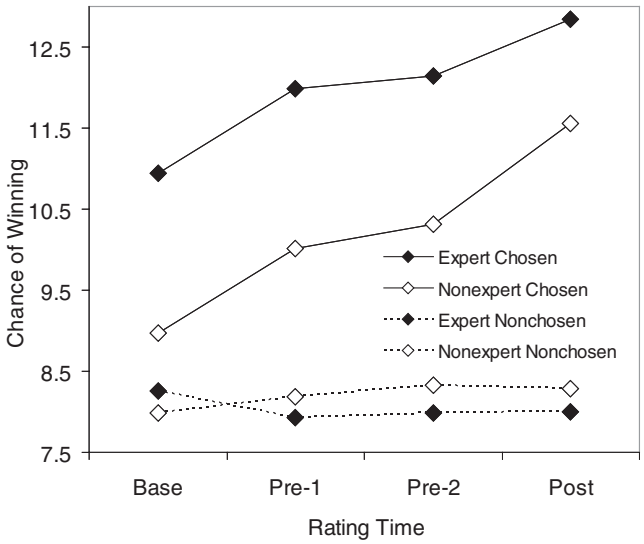

Figure 2 Ratings of chosen and nonchosen horses' chances of winning a race.
NOTE: Ratings were made by experts and nonexperts at baseline (base), the first prechoice rating time (pre-1), the second prechoice rating time (pre-2), and the postchoice rating time (post).

40.56, $p < .001$, and nonexperts, $F(1, 157) = 70.10$, $p < .001$, and ratings of nonchosen alternatives did not change significantly among experts, $p < .2$, or nonexperts, $p < .1$. An Alternative × Expertise interaction, $F(1, 254) = 46.81$, $p < .001$, revealed that experts rated their chosen alternative higher than nonexperts rated their chosen alternative, and this pattern was significant at base, $t(279) = 4.66$, $p < .001$, pre-1, $t(280) = 5.79$, $p < .001$, pre-2, $t(280) = 5.71$, $p < .001$, and post, $t(280) = 4.55$, $p < .001$ (Figure 2).

The linear trend of Alternative × Time × Condition interaction was not significant, $p < .9$, suggesting that the extent to which ratings of the chosen alternative increased across time was not moderated by condition, but linear trends confirmed that ratings of the chosen alternative increased in the no-decision, $F(1, 102) = 43.92$, $p < .001$, decision/no-consequences, $F(1, 87) = 23.13$, $p < .001$, and decision/consequences conditions, $F(1, 86) = 47.09$, $p < .001$, and ratings of nonchosen alternatives did not change in the no-decision, $p < .3$, and decision/no-consequences, $p < .91$, conditions, although ratings of the nonchosen alternatives increased slightly in the decision/consequences condition, $F(1, 78) = 5.12$, $p < .03$. The Alternative × Condition interaction was not significant, $p < .2$, but paired comparisons suggested that participants in the decision/consequences condition gave their chosen alternative higher ratings than did participants in the other two conditions. At pre-1, the chosen alternative was rated higher in the decision/consequences condition than in the decision/no-consequences condition, $t(174) = 2.28$, $p < .03$, or the no-decision condition, $t(192) = 2.35$, $p < .03$; at pre-2, the chosen alternative was rated higher in the decision/consequences condition than in the decision/no-consequences condition, $t(175) = 2.23$, $p < .03$; and at post, the chosen alternative was rated higher in the decision consequences condition than in the decision/no-consequences condition, $t(174) = 2.43$, $p < .02$, or the no-decision condition, $t(192) = 2.09$, $p < .04$ (Figure 3).

Discussion

Replicating Knox and Inkster (1968), we found that evaluations of the chosen and nonchosen alternatives spread apart after the decision, and contrary to dissonance (Festinger, 1964) and rational choice theories (Hogarth, 1987), we found that evaluations also spread apart within the predecision phase. Our results reveal that in this decision task, reevaluation of alternatives primarily involves bolstering the chosen alternative without denigrating the nonchosen alternatives. As shown in Figure 1, when participants entered a decision-making task (pre-1) they bolstered their chosen alternative, suggesting that the cognitive processes active during decision making can be seen as having a biasing effect—in this case, causing an initially tentative preference to become a strong conviction that a bet is worth making. As partici-

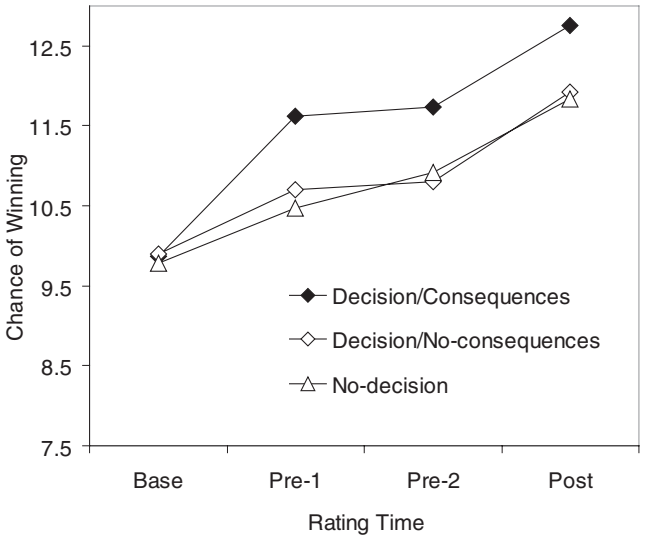

Figure 3 Ratings of chosen horse's chance of winning a race.
NOTE: Ratings were made by participants in no-decision, decision/no-consequences, and decision/consequences conditions at baseline (base), the first prechoice rating time (pre-1), the second prechoice rating time (pre-2), and the postchoice rating time (post).

pants continued through the decision-making task (pre-2) they tended to continue to bolster their chosen alternative, and after having made their decision (post), they bolstered their chosen alternative again.

Analyses of linear trend interactions revealed that expertise and task importance did not moderate the rate at which evaluations of the chosen alternative increased over time. However, experts did give higher probability estimates to their chosen alternative than nonexperts gave to their chosen alternative, suggesting that in this decision-making context experts' generally more polarized attitudes take the form of stronger preference for their chosen alternative without stronger disfavor for their nonchosen alternatives. Similarly, participants in the decision/consequences condition tended to give higher probability estimates to their chosen alternative than participants in the other two conditions gave to their chosen alternative, suggesting that the potential for positive consequences in decision making can lead to stronger preference for the chosen alternative without stronger disfavor for the nonchosen alternative.

Participants in the decision/no-consequences condition did not give higher probability estimates to their chosen alternative than participants in the no-decision condition gave to their chosen alternative, suggesting that the expectation of making a nonconsequential decision may not always lead to a stronger preference for the chosen alternative. However, we considered the possibility that participants in the no-decision condition rated their chosen alternative as highly as participants in the decision/no-consequences condition because they were able to guess that they would eventually have an opportunity to indicate which horse they thought would win the race (i.e., make a decision). Therefore, in Study 2, we improved the instructions in the no-decision condition so that participants would be less likely to anticipate being asked to make a decision.

STUDY 2

Researchers have investigated the effects of anticipated regret on the choices people make (Zeelenberg, 1999) but the effects of anticipated regret on predecision reevaluation of alternatives have not been tested (Brownstein, 2003). In several studies, anticipated regret was manipulated indirectly via expected feedback on consequences associated with the chosen alternative (e.g., Zeelenberg, Beattie, van der Pligt, & de Vries, 1996); participants who expected to receive feedback on their chosen alternative, and so could expect to find out if they made a poor choice, were supposed to experience anticipated regret, whereas participants who did not expect to receive feedback on their chosen alternative, and so did not expect to find out if they made a poor choice, were not supposed to experience anticipated regret. In light of that research, the decision/consequences condition in Study 1 can be seen as an anticipated regret condition, the other two conditions can be seen as no-anticipated regret conditions, and the results suggest that anticipated regret strengthens preference for the chosen alternative.

In Study 2, we sought a better manipulation of anticipated regret. Simonson (1992) found that instructing participants to think about how they might feel bad after a poor choice had a greater effect on their choice than telling them to expect feedback on the outcome of their choice. Following Simonson, we created a new condition in which participants expected to receive feedback on the consequences of their choice (as in the decision/consequences condition) and also were asked to think about the regret they would feel if they made a poor choice. We predicted that increasing the salience of anticipated regret would strengthen preference for the chosen alternative so that participants in this new decision/regret condition would rate their chosen alternative higher than participants in the decision/consequences condition would rate their chosen alternative.

Study 1 found that participants in the decision/consequences condition rated their chosen alterna-

tive higher than participants in the decision/no-consequences condition, suggesting that potential positive consequences can strengthen preference for the chosen alternative. Study 2 tested whether further increasing potential positive consequences would further strengthen preference for the chosen alternative. In a new condition, participants were told that if they bet on the horse that won the race they would receive extra lottery tickets (as in the decision/consequences condition) and also would receive the cash payoff associated with their winning horse. We predicted that participants in this new decision/payoff condition would rate their chosen alternative higher than participants in the decision/consequences condition would rate their chosen alternative.

Study 1 did not find that participants in the decision/no-consequences condition rated their chosen alternative higher than participants in the no-decision condition, suggesting that nonconsequential decision making may not strengthen preference for the chosen alternative. However, considering the possibility that our manipulation may have failed, in Study 2, we strengthened the instructions so that participants in the decision/no-consequences condition would be less likely to guess that their decision would have consequences and participants in the no-decision condition would be less likely to guess that they would make a decision. We predicted that participants in the decision/no-consequences condition would rate their chosen alternative higher than participants in the no-decision condition would rate their chosen alternative.

Overview and Predictions

We predicted that participants would bolster their chosen alternative throughout the decision-making process. Second, we predicted that greater expertise would strengthen preference for the chosen alternative so that experts would rate their chosen alternative higher than nonexperts would rate their chosen alternative. Third, we predicted that increasing task importance would strengthen preference for the chosen alternative so that participants in the decision/no-consequences condition would rate their chosen alternative higher than participants in the no-decision condition, participants in the decision/consequences condition would rate their chosen alternative higher than participants in the decision/no-consequences condition, and participants in the decision/payoff condition would rate their chosen alternative higher than participants in the decision/consequences condition. Fourth, we predicted that increasing the salience of anticipated regret would increase preference for the chosen alternative so that participants in the decision/regret condition would rate their chosen alternative higher than participants in the decision/consequences condition.

Methods

PARTICIPANTS

This study appeared on a Web site for psychology experiments. We obtained 219 usable data sets from the Web site's mailing list and 192 from an advertisement on a horse racing Web site.

MATERIALS

Two changes were made to all experimental conditions. First, to satisfy a new Human Subjects Committee regulation, the introductory information page told potential participants that they could obtain a single entry in our lottery without participating in any part of our experiment. Second, to make the payoffs seem valuable to participants in the decision/payoff condition, we doubled the cash payoff associated with each horse (to $9.60, $14.00, $22.40, and $32.40) and correspondingly doubled the number of lottery tickets associated with each horse (10, 14, 23, 33).

No-decision condition. The no-decision condition was the same as in Study 1 except that the instructions were modified to better ensure that the task in the second part of the study appeared to be the same as the task in the first part of the study.

As in Study 1, the page inviting participants to enter the second part of the study told them, "if you choose to participate in the second part of this study, you will review another set of charts about four horses running in a simulated race and respond to questions about those horses," and now added in parentheses, "like in the first part of the study." On the next page, the instructions which introduced the second part of the study in all of the other conditions were replaced with excerpts from the instructions used in the first part of the study. We used the same text as in the first part of the study to tell participants that the horses were competing in a race, ask them to browse through the charts, and tell them how to make their ratings. We thought that repeating these simple instructions gave participants no reason to think that the task in the second part of the study would be any different from the task they had just completed in the first part of the study.

Decision/no-consequences condition. The decision/no-consequences condition was the same as in Study 1 except that a few changes were made to the instructions to help ensure that participants understood that their decision would not involve any consequences.

As in Study 1, the page inviting participants to enter the second part of the study told them that they would be

able to choose the horse they would like to bet on but now explicitly stated that they "won't actually get to bet in this race" before telling them that they would not find out the results of the race. On the next two pages, the parts of the instructions reminding participants not to make a decision about "the bet" or "your bet" because new information might become available were rephrased to remind them not to "make a decision about which horse you would bet on."

Decision/consequences condition. The decision/consequences condition was the same as in Study 1.

Decision/payoff condition. The decision/payoff condition was the same as the decision/consequences condition except that the page inviting participants to enter the second part of the study explained the opportunity to win a payoff in addition to extra lottery tickets:

> If you bet on the horse which wins the race,
>
> 1. You will receive the monetary "payoff" listed for your winning horse in the information charts (i.e., we will send a check to your mailing address for the amount you won in the virtual race), and
> 2. We will convert your winning horse's "payoff" into extra lottery tickets by rounding up to the nearest whole dollar (so a $9.60 payoff becomes 10 extra tickets in the lottery).

Decision/regret condition. The decision/regret condition was the same as the decision/consequences condition except that in the predecision phase of the second part of the study, participants were asked to think about the regret they would experience if they made a poor choice.

On the first page of the second part of the study, the following paragraph was added to the end of the instructions:

> While you are looking over the charts and considering your bet, think about the regret you'll feel if you bet on a horse that doesn't win the race. Remember, if you bet on the horse that wins the race, we'll round its virtual payoff up to a whole number and give you that many extra tickets in the lottery. But if you bet on a horse that doesn't win the race, you'll miss out on the extra tickets and the satisfaction of betting on the winner. So try your best to pick the winner—and avoid regretting a poor choice after the race!

On the next page, the following paragraph was added to the end of the instructions, "Keep in mind the regret you'll feel if you bet on a horse that doesn't win the race. Remember, you have to bet on the horse that wins the race in order to get extra tickets in the lottery!"

Results

We predicted that participants would bolster their chosen alternative over time. A 2 (chosen, nonchosen) × 4 (base, pre-1, pre-2, post) × 2 (expert, nonexpert) × 5 (no-decision, decision/no-consequences, decision/consequences, decision/payoff, decision/regret) ANOVA revealed a main effect of alternative, $F(1, 376) = 544.18$, $p < .001$, a main effect of time, $F(2, 1128) = 62.78$, $p < .001$, and an Alternative × Time interaction, $F(3, 1128) = 62.45$, $p < .001$. A linear trend of Time × Alternative interaction revealed that evaluations of alternatives spread apart over time, $F(1, 376) = 134.57$, $p < .001$, and a linear trend confirmed that ratings of the chosen alternative increased over time, $F(1, 395) = 209.23$, $p < .001$, but a linear trend did not find that ratings of the nonchosen alternatives changed over time, $p < .7$. Paired comparisons confirmed that ratings of the chosen alternative increased significantly from base to pre-1, $t(399) = 5.56$, $p < .001$, from pre-1 to pre-2, $t(397) = 4.54$, $p < .001$, and from pre-2 to post, $t(397) = 8.81$, $p < .001$, but ratings of the nonchosen alternatives did not change significantly over time.

We predicted that both experts ($n = 158$, 93% advertisement) and nonexperts ($n = 244$, 84% mailing list; 9 not classified) would bolster their chosen alternative and that experts would rate their chosen alternative higher than nonexperts. Although the linear trend of Alternative × Time × Expertise interaction was not significant, $p < .5$, linear trends confirmed that ratings of the chosen alternative increased among experts, $F(1, 156) = 62.93$, $p < .001$, and among nonexperts, $F(1, 238) = 149.01$, $p < .001$, and ratings of nonchosen alternatives did not change among experts, $p < .2$, or nonexperts, $p < .2$. An Alternative × Expertise interaction, $F(1, 376) = 42.89$, $p < .001$, revealed that experts rated their chosen alternative higher than nonexperts rated their chosen alternative, and this pattern was significant at base, $t(400) = 4.31$, $p < .001$, pre-1, $t(398) = 5.34$, $p < .001$, pre-2, $t(398) = 4.81$, $p < .001$, and post, $t(398) = 2.74$, $p < .01$ (Figure 4).

We predicted that participants in all conditions would bolster their chosen alternative and that participants in conditions involving greater task importance or anticipated regret would give higher ratings to their chosen alternative. Although the linear trend of Alternative × Time × Condition interaction was not significant, $p < .2$, linear trends confirmed that ratings of the chosen alternative increased over time in the no-decision, $F(1, 68) = 39.16$, $p < .001$, decision/no-consequences, $F(1, 90) = 33.40$, $p < .001$, decision/consequences, $F(1, 76) = 43.64$, $p < .001$, decision/payoff, $F(1, 77) = 48.42$, $p < .001$, and decision/regret conditions, $F(1, 80) = 49.86$, $p < .001$, and ratings of nonchosen alternatives did not change in the no-decision, $p < .2$, decision/no-consequences, $p < .5$,

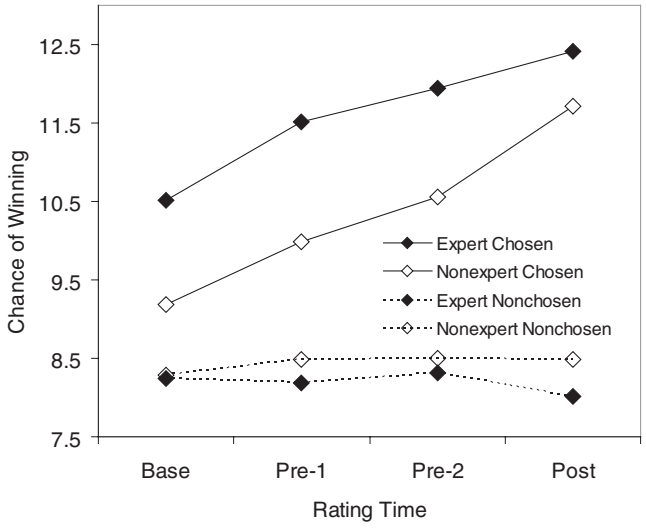

Figure 4 Ratings of chosen and nonchosen horses' chances of winning a race.
NOTE: Ratings were made by experts and nonexperts at baseline (base), the first prechoice rating time (pre-1), the second prechoice rating time (pre-2), and the postchoice rating time (post).

TABLE 1: Proportion of Participants Who Ranked Their Chosen Horse First by Experimental Condition and Rating Time

	Rating Time			
Condition	*Base*	*Pre-1*	*Pre-2*	*Post*
Decision/regret	0.36	0.55	0.70	0.83
Decision/payoff	0.50	0.55	0.63	0.85
Decision/consequences	0.43	0.49	0.62	0.80
Decision/no-consequences	0.33	0.54	0.62	0.77
No-decision	0.25	0.29	0.43	0.76

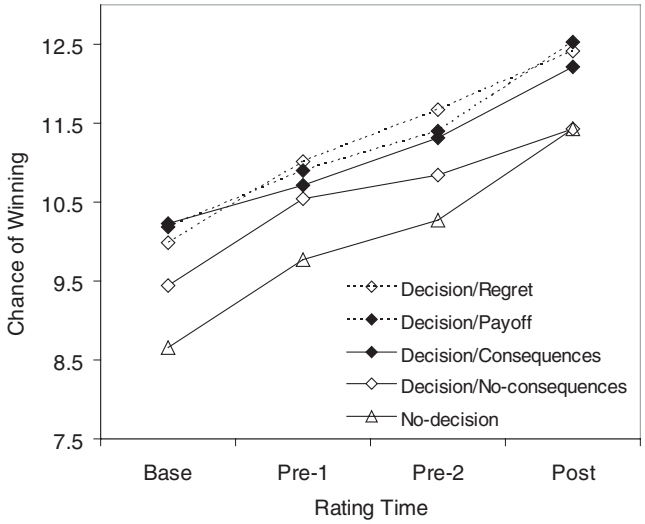

Figure 5 Ratings of chosen horse's chance of winning a race.
NOTE: Ratings were made by participants in no-decision, decision/no-consequences, decision/consequences, decision/payoff, and decision/regret conditions at baseline (base), the first prechoice rating time (pre-1), the second prechoice rating time (pre-2), and the postchoice rating time (post).

decision/consequences, $p < .8$, decision/payoff, $p < .2$, and decision/regret, $p < .6$, conditions. An Alternative × Condition interaction, $F(4, 376) = 4.77$, $p < .01$, revealed that participants in conditions involving greater task importance gave higher ratings to their chosen alternative. As shown in Figure 5, participants in the three consequential decision conditions (decision/consequences, decision/payoff, decision/regret) gave their chosen alternative similar ratings at each rating time. Pooling responses from those three consequential decision conditions (and using t tests that do not assume equal variances), we found that participants in the consequential decision conditions rated their chosen alternative higher than participants in the no-decision condition at base, $t(107) = 3.45$, $p < .01$, pre-1, $t(108) = 2.69$, $p < .01$, pre-2, $t(97) = 2.82$, $p < .01$, and post, $t(96) = 2.31$, $p < .03$. Participants in the consequential decision conditions tended to rate their chosen alternative higher than participants in the decision/no-consequences condition at base, $t(157) = 1.96$, $p < .06$, pre-2, $t(152) = 1.74$, $p < .09$, and post, $t(140) = 2.45$, $p < .02$, but not pre-1, $p < .4$. Collapsing across the three predecision rating times, participants in the decision/no-consequences condition tended to rate their chosen alternative higher than participants in the no-decision condition, $t(154) = 1.70$, $p < .1$.

At base, the instructions were the same in all conditions, so we were surprised that participants in conditions involving greater task importance rated their chosen alternative higher than participants in conditions involving lesser task importance. To better understand our data, we determined the proportion of participants who rated their ultimately chosen alternative higher than their other alternatives (ranked it first) in each condition at each rating time (Table 1). Comparing Figure 5 and Table 1 reveals that just as participants in the consequential decision conditions gave their chosen alternative higher ratings at base, they were also more likely to rank their chosen alternative first at base, suggesting that the higher ratings reflect the higher rankings. Although it was difficult for us to understand why participants who later went on to make a consequential decision would have given their chosen alternative higher ratings at

base, it was easier to understand why they would have been more likely to give their chosen alternative primary ranking at base.

Recall that the identity of the chosen alternative was determined at the time the bet was placed so that within the earlier predecision phase the ultimately chosen alternative did not necessarily have a special status. Nevertheless, at pre-1 and pre-2, participants who expected to make a decision were more likely than participants who did not expect to make a decision to favor the alternative they would eventually choose, pre-1, $\chi^2(1, N = 389) = 12.45$, $p < .001$, pre-2, $\chi^2(1, N = 377) = 9.83$, $p < .01$, suggesting that the expectation of making a decision creates a preference for a promising alternative that is later chosen. Moreover, participants who expected to make a consequential decision at pre-1 and pre-2 were more likely than participants who did not expect to make a decision, $\chi^2(1, N = 307) = 6.77$, $p < .01$, or who expected to make a nonconsequential decision, $\chi^2(1, N = 321) = 3.38$, $p < .07$, to have favored the alternative they would eventually choose at base, suggesting that the expectation of making a consequential decision not only creates a preference for a promising alternative, it maintains an earlier preference that initially appeared at base.

We believe this analysis helps explain why participants in the consequential decision conditions gave their chosen alternative higher baseline ratings than participants in the decision/no-consequences and no-decision conditions. It appears that higher ratings reflect higher rankings and that baseline rankings were highest in the consequential decision conditions because participants who were told (at pre-1) that they would make a consequential decision were most likely to maintain their initial preference (the one they had at base) as a promising alternative during decision making (pre-1 and pre-2) and eventually choose it. Baseline rankings were lower in the decision/no-consequences condition because, although participants who were told that they would make a nonconsequential decision (pre-1) also identified a promising alternative (pre-1, pre-2) that they eventually chose, that promising alternative was less likely to have been their initial preference (base). Baseline rankings were lowest in the no-decision condition, just like the other predecision rankings (pre-1, pre-2) were lowest in the no-decision condition, because participants were unlikely to prefer their ultimately chosen alternative until they were asked to make a choice.

Discussion

Study 2 successfully replicated Study 1. First, participants bolstered their chosen alternative during decision making as well as after making their choice. Second, expertise strengthened preference for the chosen alternative so that experts rated their chosen alternative higher than nonexperts rated their chosen alternative. Third, expecting to make a decision with potential positive consequences strengthened preference for the chosen alternative so that participants in the consequential decision conditions rated their chosen alternative significantly higher than participants in the no-decision condition and marginally higher than participants in the decision/no-consequences condition.

In Study 2, we strengthened the instructions in the no-decision and decision/no-consequences conditions and predicted that participants who did not expect to make a decision would rate their chosen alternative lower than participants who expected to make a nonconsequential decision. We found that the difference between ratings of the chosen alternative in the no-decision and decision/no-consequences conditions was marginally significant within the predecision phase and that participants who did not expect to make a decision were significantly less likely to maintain a preference for a single (ultimately chosen) alternative than participants who expected to make a decision. Table 1 also revealed that among participants who expected to make a decision, those who expected to make a consequential decision were more likely to maintain their initial (base) preference during decision making (pre-1, pre-2) than participants who expected to make a nonconsequential decision.

We predicted that further increasing the potential consequences associated with the choice or making anticipated regret more salient would further strengthen preference for the chosen alternative, but participants in the decision/payoff and decision/regret conditions did not rate their chosen alternative higher than participants in the decision/consequences condition. Our inability to increase preference for the chosen alternative beyond the level found in the decision/consequences condition may be partially attributable to a practical ceiling effect in the horse race paradigm. As shown in Figures 1 through 5, participants seldom give their chosen horse predecision ratings higher than 12 or postdecision ratings higher than 13 on the 15-point scale, suggesting that they may have understood that there are no sure bets at the racetrack and so were unwilling to claim maximal confidence in any horse.

GENERAL DISCUSSION

Replicating Knox and Inkster (1968), we found that after placing a bet participants bolstered probability estimates associated with their chosen alternative, and contrary to dissonance (Festinger, 1957) and rational decision (von Neumann & Morgenstern, 1944) theories, we found that they also bolstered their chosen alternative within the predecision phase. It appears that when people think about a set of alternatives, and particularly

when they expect to make a decision, they progressively bolster a promising favorite and eventually choose it. One reason participants generally did not denigrate their nonchosen alternatives may be that all of the alternatives were designed to be similarly attractive so it was easier to emphasize the many positive aspects of the favorite than to emphasize the few faults of the other alternatives. Another possible reason may be that it requires less mental effort to bolster a single promising alternative than to denigrate several other alternatives.

Expertise

Previous research suggests that compared to nonexperts, experts have more polarized attitudes and their attitudes polarize more over time (Lusk & Judd, 1988; Millar & Tesser, 1986). Based on that research, we expected experts to develop stronger preferences during decision making. We did find that experts expressed stronger preferences for their chosen alternative at each rating time, but we did not find that expertise moderated the rate at which evaluations of the chosen alternative changed over time. The fact that experts did not bolster their chosen alternative over time as much as we expected may be partially attributable to a ceiling effect in our paradigm because they often rated their chosen alternative 12 at pre-2 and we were unable to induce participants to rate their chosen alternative higher than 13 even at post (decision/payoff and decision/regret conditions). Indeed, Figure 4 shows that in Study 2, experts' ratings of their nonchosen alternatives decreased from pre-2 to post, suggesting that when they were unable to continue spreading their alternatives apart by further bolstering their chosen alternative they resorted to denigrating their nonchosen alternatives.

Task Importance

Previous research on the effects of decision consequences has been inconclusive; research using moderately negative consequences found that increasing consequences increased predecision reevaluation of alternatives (Mills & Ford, 1995; O'Neal, 1971) but research using moderately positive consequences found that increasing consequences decreased reevaluation (Tyszka, 1998), suggesting that the effects of decision importance may be moderated by the valence of the consequences. However, we found that increasing positive consequences strengthened preference for the chosen alternative within the predecision phase, suggesting that increasing consequences generally increases predecision reevaluation of alternatives and leaving no apparent explanation for Tyszka's discrepant results.

Our finding that participants in the consequential decision conditions, who expected feedback on the consequences of their choice and so could anticipate regretting a poor choice (Zeelenberg, 1999), expressed stronger preferences than participants who did not expect consequential feedback suggests that anticipated regret may not only affect the choices people make but it also may increase predecision reevaluation of alternatives. However, our inability to further strengthen preferences in the consequential decision conditions by increasing the salience of anticipated regret renders our results merely suggestive and calls for further research on how anticipated regret affects predecision processing.

Consistent with previous research (O'Neal, 1971; O'Neal & Mills, 1969) that found that participants who expected to make a decision reevaluated their alternatives to a greater extent than participants who did not expect to make a decision, we found that the expectation of making a nonconsequential decision tended to strengthen preference for the chosen alternative within the predecision phase and significantly increased the probability of maintaining a single promising alternative during decision making. The emergence of a promising alternative during decision making is an important theoretical point because it makes predecision dissonance possible. Festinger (1957, pp. 39-40) maintained that dissonance (which he defined as inconsistency) could not occur before a decision because in his analysis there was no pair of cognitive elements present within the predecision phase that could be dissonant with each other. However, Jecker (1968) pointed out that if a favorite emerged during decision making it would be dissonant with its own negative attributes and the positive attributes of the other alternatives, so that dissonance could occur before a decision.

Participants who did not expect to make a decision were less likely to have maintained their ultimately chosen alternative as a favored alternative during the predecision phase but they did bolster it to a significant degree, suggesting that people may reevaluate alternatives even under conditions of minimal task importance (cf. Simon, Pham, Le, & Holyoak, 2001). This finding, which suggests that some degree of bias may be an integral part of processing whenever a person considers a set of alternatives, is similar to previous research showing that thought or repeated expression leads to attitude polarization outside of the decision-making context (Judd & Brauer, 1995; Tesser, 1978).

Theoretical Integration

A consistency maintenance framework can integrate our major findings. Constraint Satisfaction Theo-

ries (CST) use principles of neural network modeling (McClelland & Rumelhart, 1986) to concretize and extend early consistency theories (Festinger, 1957; Heider, 1958). CST views cognitive processing as involving the spreading of activation among interconnected elements, with elements that are mutually consistent increasing each other's activation and elements that are mutually inconsistent decreasing each other's activation, so that over time people achieve an internally consistent understanding of their world (Read, Vanman, & Miller, 1997; Simon & Holyoak, 2002).

CST suggests that a highly activated element representing a promising alternative increases the activation of consistent elements and decreases the activation of inconsistent elements, so an element representing an emerging favorite at the racetrack would increase activation of consistent elements such as its perceived chance of winning a race and decrease activation of inconsistent elements such as the perceived chance the other horses would win a race. The decreasing activation of elements inconsistent with the emerging preference is similar to the deemphasizing of elements inconsistent with an emerging preference that would be predicted by dissonance theory. The emergence of a promising alternative and bolstering of its perceived chance of winning could lead decision makers to selectively search for information consistent with the emerging preference and selectively disregard inconsistent information, a strategy frequently used to reduce dissonance (Frey, 1986) and similar to biased hypothesis testing.

CST also suggests that experts' estimates of their favorite horse's chance of winning are more extremely optimistic because experts have stronger links between elements and stronger links enable units to affect each other's activation levels more quickly and more extensively. CST's account of the expertise effect is similar to Tesser's (1978) formulation, in which he suggested that it is maintenance of consistency within a schema that leads to attitude polarization, and because experts have more developed schemas for their domain of expertise their attitudes polarize to a greater degree. Both views are based on consistency maintenance and attribute experts' stronger preferences to more efficient processing, but whereas Tesser requires a discrete schema for the area of expertise, CST suggests that experts have stronger links between relevant units within a broader system. Finally, CST suggests that estimates of a favorite horse's chance of winning are more extremely optimistic under conditions of greater task importance because when people expect to make a more important decision they devote a greater amount of processing to the decision, and increased processing enables units to have a greater effect on each other's activation levels.

Relation to Optimism

Our finding that participants reported increasingly optimistic assessments of their chosen alternative may seem discrepant with research that found that optimism decreased closer to the time for performance or feedback (Shepperd, Ouellette, & Fernandez, 1996; Taylor & Shepperd, 1998). However, the task in our research, which involved estimating which horse was most likely to win a race, can be distinguished from the task in the previous research, which involved estimating confidence or expected performance in potentially difficult or self-threatening tasks (e.g., potential threat of illness, expected grades on an exam, prospects for future jobs). Results from Shepperd, Findley-Klein, Kwavnick, Walker, and Perez (2000) suggest that in the previous research, participants may have imagined a poor outcome and then, bracing themselves for a loss, became pessimistic, whereas in our research, participants may have imagined a positive outcome (their horse winning the race) and then, focusing on the expected positive outcome, became increasingly optimistic. Alternatively, CST suggests that in the previous research, maintenance of consistency with an expected negative outcome led to pessimism, whereas in our research, maintenance of consistency with an expected positive outcome led to greater optimism.

Conclusions

We found that when people thought about a set of alternatives, evaluations of the chosen and nonchosen alternatives spread apart, primarily by means of bolstering the chosen alternative. This bolstering occurs both pre- and postdecisionally. We also found that people who expected to choose from a set of alternatives were likely to focus processing on a promising alternative. Finally, we found that greater individual expertise or potential positive consequences increased strength of preference for the chosen alternative within the predecision phase.

REFERENCES

Brehm, J. W. (1956). Postdecision changes in the desirability of alternatives. *Journal of Abnormal and Social Psychology, 52*, 384-389.

Brownstein, A. L. (2003). Biased predecision processing. *Psychological Bulletin, 129*(4), 545-568.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Festinger, L. (1964). *Conflict, decision, and dissonance*. Stanford, CA: Stanford University Press.

Frey, D. (1986). Recent research on selective exposure to information. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 41-80). New York: Academic Press.

Gerard, H. B., & White, G. L. (1983). Post-decisional reevaluation of choice alternatives. *Personality and Social Psychology Bulletin, 9*(3), 365-369.

Heider, F, (1958). *The psychology of interpersonal relations*. Oxford, UK: Wiley.

Hogarth, R. M. (1987). *Judgement and choice* (2nd ed.). NewYork: John Wiley.

Jecker, J. D. (1968). Conflict and dissonance: A time of decision. In R. P. Abelson, E. Aronson, W. J. McGuire, T. M. Newcomb, M. J. Rosenberg, & P. H. Tannenbaum (Eds.), *Theories of cognitive consistency: A sourcebook*. Chicago: Rand McNally.

Judd, C. M., & Brauer, M. (1995). Repetition and evaluative extremity. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 43-71). Hillsdale, NJ: Lawrence Erlbaum.

Knox, R. E., & Inkster, J. A. (1968). Postdecision dissonance at post time. *Journal of Personality and Social Psychology, 8*(4), 319-323.

Lusk, C. M., & Judd, C. M. (1988). Political expertise and the structural mediators of candidate evaluations. *Journal of Experimental Social Psychology, 24*, 105-126.

McClelland, J. L., & Rumelhart, D. E. (1986). *Parallel distributed processing: Explorations in the microstructure of cognition. Vol. 2. Psychological and biological models*. Cambridge, MA: MIT Press.

Millar, M. G., & Tesser, A. (1986). Thought-induced attitude change: The effects of schema structure and commitment. *Journal of Personality and Social Psychology, 51*(2), 259-269.

Mills, J., & Ford, T. E. (1995). Effects of importance of a prospective choice on private and public evaluations of the alternatives. *Personality and Social Psychology Bulletin, 21*(3), 256-266.

Montgomery, H. (1983). Decision rules and the search for a dominance structure: Towards a process model of decision making. In P. C. Humphreys, O. Svenson, & A. Vari (Eds.), *Analysing and aiding decision processes* (pp. 343-369). Amsterdam/Budapest: North-Holland and Akademiai Kiado.

O'Neal, E. (1971). Influence of future choice importance and arousal upon the halo effect. *Journal of Personality and Social Psychology, 19*(3) 334-340.

O'Neal, E., & Mills, J. (1969). The influence of anticipated choice on the halo effect. *Journal of Experimental Social Psychology, 5*, 347-351.

Read, S. J., Vanman, E. J., & Miller, L. C. (1997). Connectionism, parallel constraint satisfaction processes, and Gestalt principles: (Re)introducing cognitive dynamics to social psychology. *Personality & Social Psychology Review, 1*(1), 26-53.

Shepperd, J. A., Findley-Klein, C., Kwavnick, K. D., Walker, D., & Perez, S. (2000). Bracing for loss. *Journal of Personality and Social Psychology, 78*(4), 620-634.

Shepperd, J. A., Ouellette, J. A., & Fernandez, J. K. (1996). Abandoning unrealistic optimism: Performance estimates and the temporal proximity of self-relevant feedback. *Journal of Personality and Social Psychology, 70*(4), 844-855.

Simon, D., & Holyoak, K. J. (2002). Structural dynamics of cognition: From consistency theories to constraint satisfaction. *Personality & Social Psychology Review, 6*(4), 283-294.

Simon, D., Pham, L. B., Le, Q. A., & Holyoak, K. J. (2001). The emergence of coherence over the course of decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition* (Special Issue), *27*(5), 1250-1260.

Simonson, I. (1992). The influence of anticipating regret and responsibility on purchase decisions. *Journal of Consumer Research, 19*, 105-118.

Svenson, O. (1992). Differentiation and consolidation theory of human decision making: A frame of reference for the study of pre- and postdecision processes. *Acta Psychologica, 80*, 143-168.

Taylor, K. M., & Shepperd, J. A. (1998). Bracing for the worst: Severity, testing, and feedback timing as moderators of the optimistic bias. *Personality and Social Psychology Bulletin, 24*(9), 915-926.

Tesser, A. (1978). Self-generated attitude change. *Advances in Experimental Social Psychology, 11*, 289-338.

Tyszka, T. (1998). Two pairs of conflicting motives in decision making. *Organizational Behavior and Human Decision Processes, 74*(3), 189-211.

von Neumann, J., & Morgenstern, O. (1944). *Theory of games and economic behavior*. Princeton, NJ: Princeton University Press.

Zeelenberg, M. (1999). Anticipated regret, expected feedback, and behavioral decision making. *Journal of Behavioral Decision Making, 12*, 93-106.

Zeelenberg, M., Beattie, J., van der Pligt, J., & de Vries, N. K. (1996). Consequences of regret aversion: Effects of expected feedback on risky decision making. *Organizational Behavior and Human Decision Processes, 65*(2), 148-158.

Received March 27, 2003
Revision accepted September 12, 2003