Biased Evaluation and Persistence in Gambling

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Perhaps the most striking aspect of gambling behavior is that people continue to gamble despite persistent failure. One reason for this persistence may be that gamblers evaluate outcomes in a biased manner. Specifically, gamblers may tend to accept wins at face value but explain away or discount losses. Experiment 1 tested this hypothesis by recording subjects' explanations of the outcomes of their bets on professional football games. The results supported the hypothesis: Subjects spent more time explaining their losses than their wins. A content analysis of these explanations revealed that subjects tended to discount their losses but "bolster" their wins. Finally, subjects remembered their losses better during a recall test 3 weeks later. Experiments 2 and 3 extended this analysis by demonstrating that a manipulation of the salience or existence of a critical "fluke" play in a sporting event had a greater impact on the subsequent expectations of those who had bet on the losing team than of those who had bet on the winning team. Both the implications and the possible mechanisms underlying these biases are discussed.

In 1980 gamblers lost $2.3 billion at the Nevada casinos (Curtis, Note 1). The picture was much the same at the country's horse-racing establishments, with $329 million lost at California racetracks alone (California Horse Racing Board, Note 2). In addition to these official figures, untold sums were bet and lost through illegal bookmakers and numbers racketeers. Clearly, gambling constitutes a significant financial drain on the betting public. It is also clear from even the most casual observation of various gambling establishments that only a small portion of these losses are sustained by novice or first-time gamblers. Most of this money is lost by people who have bet, and generally lost, in the past.

Why do people persist in such an unrewarding enterprise? Why do so many people, in apparent violation of the law of effect, continue to gamble despite previous failure and despite payoffs that—for most gambling ventures—are invariably negative in the long run?

Social scientists have proposed a number of different answers to these questions. In perhaps the best known example, behaviorists have attempted to explain the perseverance of gamblers by likening the sequence of outcomes in most gambling ventures to variable-ratio, variable-magnitude reinforcement schedules (Knapp, 1976; Skinner, 1953). Just as these schedules produce energetic responses by laboratory animals that are resistant to extinction, they also lead to animated gambling by casino patrons that persists despite a majority of negative outcomes. Alternative explanations have focused on the social and experiential benefits derived from gambling (Campbell, 1976; Goffman, 1967; Herman, 1976a, 1976b; Ignatii & Smith, 1976). According to this general perspective, gambling provides various nonmonetary benefits—such as intense excitement or "action"—that more than offset most financial

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losses and thus motivate people to continue betting.

These explanations no doubt contribute a great deal to our understanding of the psychology of gambling. Nevertheless, I propose that we can increase our knowledge of why people continue to gamble despite persistent losses by examining this question in the broader context of what is known about attitudes and attitude change. Perhaps the most common conclusion derived from research in this area is that people's attitudes, beliefs, and opinions can be remarkably resistant to change. This resistance to attitude change has been found in a number of areas, including reactions to persuasive communications (Hovland, Janis, & Kelley, 1953; McGuire, 1969), the maintenance of stereotypes (Hamilton, 1979; Katz, 1960), postdecisional judgments and attitudes (Festinger, 1957; Janis, 1968), and belief and theory perseverance (Anderson, Lepper, & Ross, 1980; Ross, 1977; Ross, Lepper, & Hubbard, 1975).

From this perspective the tendency for gamblers to persevere in the face of previous failure may be seen as one example of this pervasive attitudinal inertia. According to the present formulation, many gamblers have, or acquire, a belief that they will be successful, and this belief tends to persist despite seemingly convincing evidence to the contrary. Confident that success is just around the corner, gamblers continue to gamble despite persistent previous losses.

The reason, in this view, that gamblers' initial faith in their ability to be successful often survives the challenge of frequent losses is that gamblers tend to evaluate outcome information in a biased manner. Specifically, successful outcomes tend to be readily accepted as reflections of one's gambling skill or the soundness of one's system, whereas unsuccessful outcomes are often explained away and discounted. As a result successes tend to increase one's expectations more than losses decrease them so that one may remain more confident over time than either the objective odds or the pattern of past outcomes may justify.

The best examples of such biased evaluation come from betting on sporting events. If your detailed knowledge of two football teams leads you to bet on the eventual winning team, you would no doubt accept that outcome as evidence of your superior insight and gambling skill—never mind that fumble in the fourth quarter that allowed your team to score the winning touchdown. (Something like that had to happen sooner or later because, after all, you had bet on the superior team.) In contrast, if you had bet on the losing team, you would hardly accept that outcome as evidence of your lack of insight or gambling skill, because if not for that "fluke" fumble in the fourth quarter that allowed the other team to score the winning touchdown, your team would have won. Thus, the outcome was not really a loss but a "near win."

Although these ideas may be new to any formal treatment of the psychology of gambling, much evidence in support of this biased evaluation process can be found in the broader area of attitudes and social cognition. Research in this area has shown that people are biased in their encoding and retrieval of information (Hamilton, 1979; Hastie & Kumar, 1979), in their perceptions of covariation (Chapman & Chapman, 1967, 1969; Jennings, Amabile, & Ross, 1982), in their strategies for testing presuppositions or hypotheses (Snyder & Swann, 1978; Wason & Johnson-Laird, 1965), and in their evaluations of empirical evidence (Lord, Ross, & Lepper, 1979; Mahoney, 1977). Furthermore, the attribution literature suggests that people are also biased in their evaluation of personal outcomes. Wong and Weiner (1981) found that people ask themselves a greater number of "why" questions after failure than after success. Thus, people apparently accept success at face value but carefully scrutinize failure. In many contexts there is a strong correlation between expected and successful outcomes on the one hand and unexpected and unsuccessful outcomes on the other. In the domain of gambling, this is perhaps most true for ventures such as betting on sports events, in which one does not repeatedly engage in many undifferentiated
trials (as in roulette, for example) but can choose to bet only when one is relatively confident of success. In such cases it is difficult to separate the effects of expectation from the effects of outcome: One may expect success on nearly all bets and thus may be more likely to scrutinize and to explain unexpected losses than expected wins.

The present research was designed to demonstrate that gamblers do in fact evaluate outcomes in such a biased manner and to point out how this bias may lead them to persist in unrewarding gambling activities. Before presenting this research, I should clarify two points. First, the processes described here are offered as one explanation of why many people continue to gamble in the face of persistent failure. This formulation does not directly address the related question of why people begin to gamble in the first place. Second, although the present formulation encompasses gambling as it is broadly defined, the experiments reported here all involve betting on sports events. The question of how the present findings apply to broader notions of gambling is addressed in the final discussion.

Experiment 1

The present analysis leads to several straightforward hypotheses. First, if gamblers do tend to explain away and discount their losses, then they ought to spend more time spontaneously scrutinizing and explaining their losses than their wins. Furthermore, the nature of gamblers' explanations for wins and losses should be quite different. Explanations for losses should serve to discount the outcome whereas those for wins should tend to emphasize the outcome's inevitability. Finally, if gamblers do spend more time reexamining their losses than their wins, then the greater attention that is devoted to losses should make them more memorable. This experiment, in which subjects bet on the outcomes of professional football games, was designed to test all three hypotheses.

Method

Subjects. To collect a pool of subjects who were knowledgeable about professional football, sign-up sheets that sought paid volunteers who follow and bet on football games were distributed in two large lecture classes at Stanford University. Twenty-nine undergraduates (28 men and 1 woman) were recruited from these lists and served as subjects.

Overview. This experiment took place during the 1980 National Football League (NFL) season. All subjects were run individually in three experimental sessions. In Session 1 subjects made a series of bets on the upcoming week's slate of pro football games. Four to 7 days later in Session 2, subjects settled their bets with the experimenter and provided a tape-recorded account of their thoughts about the games that had just been played. These tapes provided the raw data on subjects' explanations of wins and losses. Finally, Session 3 took place 3 weeks later when subjects were contacted by telephone and asked to recall what they could about the games they had bet on in Session 1. This experiment utilized four different groups of subjects so that subjects' bets—taken together—were on games from four different weeks of the NFL season.

Session 1. Subjects were told that they would be paid $3 to make a series of hypothetical bets on various pro football games that were being played that week. To ensure that subjects were motivated to perform as well as possible, they were told that they could earn a bonus of $1 to $20, depending on how well their bets came out relative to those of other subjects. The experimenter explained that he could not determine which subjects had earned bonuses until all subjects had been run and that therefore the bonuses would not be given out until the end of the 1980 season. Finally, subjects were told that the research required that they participate in this same experiment (each with three sessions) several more times during the 1980 season and that they would receive $3 for each time. This last statement served to set up the purported rationale for the dependent measures collected during Session 2.

The betting procedure worked as follows: Subjects were given a hypothetical "stake" of $250 with which to bet as they saw fit. The experimenter explained that their chances of receiving bonus money would depend on how large this hypothetical stake became. The only constraints imposed on subjects were that they had to bet on at least five games and they had to bet a total of at least $100. In all cases subjects were betting on which team would cover or beat the point spread and not simply on which team would win the game. The point spreads for all games were taken from the official Las Vegas line as published in the San Francisco Chronicle.

Upon making each bet, subjects indicated on a 7-point scale how confident they were that they would win that bet. After completing their bets, the subjects were scheduled for Session 2 and asked to follow carefully various media accounts of the games that were played that week.

Session 2. The first part of Session 2 was devoted to settling subjects' bets. The experimenter went over all the games with the subjects, tallying the extent to which their original $250 stake had grown or shrunk. The experimenter was careful not to indicate whether the outcomes of subjects' bets would be likely to put them in the running for one of the bonuses. The subjects were then paid the guaranteed $3 for participating in the experiment.

The experimenter proceeded to collect the primary dependent measures in the following manner: The experimenter reiterated the necessity of having the subjects
participate in this experiment several times during the season, the next time being 3 weeks later in the season. The subjects were told that this repetition was necessary because one of the purposes of the experiment was to see how much people’s performance improved over time. In light of this goal, it was important that subjects’ bets in subsequent weeks be made with the full benefit of any knowledge gained from their previous bets. Accordingly, subjects were told that before making their subsequent bets, they would receive their old data sheets detailing the outcomes of their previous bets. In addition, subjects were told that it would be useful in subsequent weeks if they could consult a record of their thoughts about their past bets before betting on future games. Specifically, subjects were told,

In many games there are various plays, calls by the officials, or other factors that turn what could have been a loss into a win and vice versa. It would be useful for you to have a record of these factors as well. So, what I’d like you to do is to state into this tape recorder anything about the events in any of this week’s games that you think was important in determining the outcome of these games, and therefore might be useful in helping you make your choices three weeks from now. Make any clarifications, explanations, or qualifications that seem relevant.

The subjects were told that they would be allowed to play this tape back to themselves before making their bets in subsequent weeks. The experimenter then left the room to allow the subjects to make their tapes in private. The subjects were given that week’s Monday morning sports section, containing write-ups of the previous Sunday’s games, to allow them to become familiar with all of the games if they had not already done so. The subjects’ tapes provided the raw data from which differences in the quantity and quality of subjects’ explanations for wins and losses could be assessed.

After the subjects finished recording their thoughts about the past week’s games, the experimenter returned and briefly discussed the procedure for Session 3. Subjects were told that the experimenter would call them 3 weeks later to ask a few follow-up questions and schedule them for their next trial of the experiment.

Session 3. Approximately 3 weeks after Session 2, subjects were contacted over the telephone and asked to recall the games on which they had previously bet. The experimenter making this request did not know on which games the subjects had bet, nor, by implication, which games they had won or lost. The subjects first recalled all the games they could without any additional prompting by the experimenter. After the subjects had indicated all the games they could remember, the experimenter went back over each game that they had recalled and asked if they could remember what the score was, whether there were any particularly important plays in that game, and (if subjects had earlier recalled only one team) who the opposing team was.

After collecting this recall measure, the experimenter debriefed the subjects and tried to determine if there were any suspicions about the experiment. This procedure revealed that all subjects seemed completely convinced that they were to participate in this experiment

![Figure 1](image-url)

**Figure 1.** Mean percentage of time subjects spent discussing their wins and losses. (The percentage of time each subject was expected to discuss his wins and losses was derived from the percentage of bets he or she had won and lost.)

several times during the season and that their tapes were to be used for the purposes described. Nevertheless, several subjects did suspect that the experimenter might listen to their tapes at some point.

**Results**

**Explanation data.** To determine whether subjects tended to reexamine and explain their losses more than their wins, the amount of time subjects spent discussing each game was transcribed from subjects’ tapes by two independent judges blind to which games the subjects had won or lost (intrater reliability = .94). These data were analyzed in two ways. First, the percentage of time subjects spent discussing their losses was compared to the percentage expected on the basis of the percentage of bets they had lost. The results of this comparison are presented in Figure 1. Figure 1 shows quite clearly that subjects spent more time than expected discussing their losses, *t*(23) = 2.33, *p* < .05, and—by necessity—less time than expected discussing their wins. A slightly different analysis compared the mean length of time subjects spent discussing their wins and losses. This procedure revealed that subjects spent significantly

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1 The order in which win and loss were placed in this sentence was counterbalanced across subjects. Changing the order of these terms had no effect on any of the dependent measures and thus receives no further discussion.

2 A total of five subjects either won or lost all of their bets. As a result, their data could not be included in the present within-subject analysis.
The findings that subjects spent more time explaining their losses than their wins provides some compelling, though indirect, support for the proposed biased evaluation process. To obtain more direct evidence of such a bias, a content analysis was performed on the comments that subjects made about their wins and losses. Subjects' comments about each game were rated on a 3-point scale. One end of the scale represented "undoing" comments, or those in which the subject stated that the outcome should have turned out differently (Kahneman & Tversky, 1982). The other end represented "bolstering" comments, or those in which the subject indicated that the observed outcome either should have happened exactly as it did or should have been even more extreme in the same direction. Comments falling into neither of these categories were assigned to the midpoint of the scale.

If subjects did evaluate outcomes in the hypothesized biased manner, more undoing comments should have been made about losses, and more bolstering comments should have been made about wins. Table 1 presents the distribution of undoing and bolstering comments for wins and losses. Because the interrater reliability for this scale was only moderately high ($r = .55$), these data are presented in two ways. The first shows the distribution of comments that were rated as undoing or bolstering by either judge; the second shows the distribution of only those undoing or bolstering comments that both judges agreed on. In either case, the results are quite clear: Nearly all undoing comments were made about losses, and nearly all bolstering comments were made about wins. To test the significance of these data, the following analysis was performed. For each subject, the number of comments that did not conform to the hypothesis (i.e., undoing comments about wins or bolstering comments about losses) was subtracted from the number of comments that did conform (i.e., undoing comments about losses and bolstering comments about wins). Paired $t$ tests performed on these difference scores revealed that subjects made significantly more comments that conformed to the hypothesis than those that did not. This was true for com-

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More time discussing their losses ($M = 17.66$ sec) than their wins ($M = 10.70$ sec), $t(23) = 2.49$, $p < .05$.

Interestingly, the amount of time subjects spent discussing an outcome did not vary with how unexpected the outcome was. Looking at the data for losses only, the correlation between the amount of time subjects spent discussing an outcome and their initial confidence that they would win that bet was essentially zero ($r = .06$). Truly surprising losses were not discussed any more than mildly unexpected ones.

It is necessary to consider a possible alternative explanation of the data presented so far. As shown in Figure 1, subjects tended to lose more bets than they won. Thus, the observed results may not stem from any general tendency to explain losses more than wins but may simply be the result of a tendency to explain the most common outcome. To investigate this possible artifact, the data from only those subjects who won more games than they lost were examined. Obtaining similar data from these subjects would serve to rule out this alternative explanation. Although the number of such subjects was quite small ($n = 6$), their data did not differ from the sample as a whole: The overall sample spent 10% more time than expected discussing their losses, and the subsample of successful bettors spent 9% more time than expected. Thus, the present finding cannot be considered simply the result of a tendency to discuss the most common outcome.
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ments that were categorized as undoing or bolstering by either judge, \( t(23) = 4.68, p < .001 \), and by both judges, \( t(23) = 3.06, p < .01 \).

**Memory data.** Subjects' recall for wins and losses was measured with respect to four variables: whether they could remember (for each bet) the team they had bet on, the team they had bet against, the score of the game, and at least one key play or incident in the game. Figure 2 presents the mean percentage recall for wins and losses for each of these four variables. It is quite clear from this figure that subjects remembered more information about their losses than their wins. This was true of each of the four items of information. Taken together, subjects remembered 47% of the information about their losses and only 27% of the information about their wins, \( t(12) = 2.33, p < .05 \). In support of the notion that it was the greater amount of time that subjects spent dwelling on their losses that made the losses more memorable, there was a significant correlation between the amount of time subjects discussed various games in Session 2 and their memory for those games in Session 3 (\( r = .39, p < .01 \)).

One can also ask whether subjects who remembered both wins and losses tended to recall their losses before their wins. Of the 13 subjects who were contacted for Session 3 after the appropriate interval, 10 managed to recall some combination of both wins and losses. The games that these subjects remembered were ranked in the order in which they were recalled. The mean rank of each subject's losses was then compared to the mean rank expected on the basis of the number of wins and losses recalled. This analysis revealed that the observed mean ranks were significantly higher than expected, \( t(9) = 2.80, p < .025 \). In other words, subjects tended to recall their losses before their wins.

**Discussion**

The results of this experiment provide clear support for the hypotheses. First, subjects spent significantly more time reexamining and discussing their losses than their wins. Second, the type of comments that subjects made about their wins and losses were quite different: Subjects tended to undo their losses and bolster their wins. Finally, because subjects devoted more attention to their losses, their losses were more memorable.

This latter result is particularly interesting for at least three reasons. First, it casts doubt on a possible alternative interpretation of the explanation data—that is, that subjects tended to explain away their losses so as not to appear, in the eyes of the experimenter, to be lacking in judgment or gambling skill. For the memory data, a desire to look good in front of the experimenter would, if anything, have produced the opposite pattern of results: Subjects would surely have wanted to recall for the experimenter as many of their successes as possible. Since the memory findings reinforce the explanation data without being subject to the same demands, such an alternative explanation seems rather implausible.

Second, the memory data are also interesting because of their similarity to the Zeigarnik effect, or the tendency to recall interrupted tasks better than uninterrupted tasks (Zeigarnik, 1967). The present data extend Zeigarnik's findings by obtaining analogous

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3 This analysis includes the data from all subjects who were successfully contacted 3 weeks after Session 2. One group of 11 subjects was not contacted until 4\( \frac{1}{2} \) weeks after Session 2. Not surprisingly, these subjects' recall for both wins and losses was much poorer than that of the other subjects. When the data from these subjects are included in the analysis, the results are marginally significant, \( t(23) = 1.86, p < .10 \).

4 Of the 11 subjects who were not contacted for Session 3 until 4\( \frac{1}{2} \) weeks after Session 2, 5 managed to recall some combination of both wins and losses. When the data from these subjects are included in this analysis, the results are unchanged, \( t(14) = 2.69, p < .02 \).
results for success and failure. The similarities between failure and interrupted tasks suggest that the mechanism responsible for these effects is probably quite similar. Many incompleted tasks and personal failures constitute “unfinished business” that we obsess about in order to complete, to correct, or to fully understand. The extra attention that we devote to failures and incompleted tasks keeps them in mind longer and presumably makes them more memorable.

Finally, the memory data are also interesting because they conflict with the widely held belief that people selectively remember their successes and forget or repress their failures to protect their self-esteem (cf. Greenwald, 1980). In support of this belief, two studies (Glixman, 1949; Rosenzweig, 1943) reportedly demonstrated that under ego-involving conditions, successes are in fact better remembered than failures, a seemingly direct contradiction of the present results. However, the conflict between the present findings and either the general notion of ego-defensiveness or these two previous studies in particular may be more apparent than real. These studies, unlike the present experiment, used a procedure that minimized the likelihood that subjects would engage in the reexamination of failure, which appears to be responsible for its greater memorability. In both studies subjects were asked to complete various tasks, such as solving jigsaw puzzles, and were occasionally interrupted before they could finish. The interrupted tasks constituted the failures and the uninterrupted tasks constituted the successes. In this paradigm it is hardly surprising that failures were not better remembered than successes. One would certainly spend little time trying to explain away or make sense of one’s failures because they are already perfectly well explained—the experimenter simply did not provide enough time. Thus, in contrast to the present experiment, one would not expect these failures to be particularly well remembered.

The broader conflict between the present results and the general notion of ego-defensiveness also turns out to be rather superficial unless one assumes that nearly all threats to a person’s self-image are met by repression. That is surely not the case. Presumably, it is those shortcomings that are most central to one’s self-image and it is those that one can do little about that are most likely to be forgotten. More minor threats, and those that one may continue to face, may be dealt with more adaptively. In the present experiment subjects thought that they would be betting several more times during the season. Thus, rather than forgetting their mistakes, they may have focused on their losses in an attempt to learn from them. Furthermore, the fact that subjects remembered their losses better than their wins need not be considered adaptive. In fact, the general process being proposed in this research can be considered as an alternative defensive strategy: Rather than repressing one’s failures, one simply explains away and discounts them.

Experiment 2

The biased evaluation process described in Experiment 1 is surely more likely to occur under some conditions than others. Certain outcomes contain various mitigating circumstances or random events that are likely to prompt reexamination of the outcome and make discounting particularly easy. By manipulating the salience of such an extenuating circumstance, one should be able to manipulate the occurrence or the strength of this biased evaluation process and its resultant effects. According to the present formulation, such a manipulation should have a much greater effect on those for whom the outcome was negative than on those for whom it was positive.

Once again, the best examples come from betting on sports events. Particularly salient random events or “fluke” plays that occur in a basketball or football game may be assigned more significance by those who bet on the losing team than by those who bet on the winning team. Losers may use such fluke plays to explain away the outcome; winners may discount the significance of such plays. As a result, the lessons that winners and losers learn from the outcomes of such games may be dramatically different, with predictable implications for their future bets.

The present experiment utilized a specific sporting event—the 1980 National Collegiate Athletic Association (NCAA) championship
basketball game between the University of California, Los Angeles (UCLA) and the University of Louisville—as a context in which to test this idea. The important features of that game were the following: UCLA led by four points with 2 minutes to play when one of their players, all-American Kiki Vandeweghe, stole a Louisville pass, dribbled the length of the court, and, after being bumped by a Louisville player, missed a relatively easy shot. Vandeweghe and the UCLA fans claimed he was fouled; Louisville players and fans believed there was only incidental contact. No foul was called. If Vandeweghe had made the basket or been awarded two foul shots, he could have put UCLA ahead by six points with less than 2 minutes to play and could conceivably have clinched the game. Instead, Louisville came back to win and become NCAA champion.

Thus, this game provided a convenient vehicle for examining the hypothesis that people are biased in their evaluation of outcome-relevant information. This game was a widely watched, close contest that arguably was determined by a critical fluke play—Vandeweghe's missed shot. According to the present formulation, this play should have a greater influence on the subsequent predictions and betting behavior of the losing (UCLA) fans than of the winning (Louisville) fans. To test this idea, a number of people were contacted by telephone and asked—after it was ascertained that they had seen the game—which team they had rooted for or bet on. For half of the subjects, Vandeweghe's missed lay-up was made salient; for the other half it was not. It was hypothesized that making this play salient would greatly increase UCLA fans' expectations of their team's performance in hypothetical future games against Louisville but have no effect on Louisville fans' expectations of their team's performance in such games.

Method

The subjects, all male Stanford University students, were contacted over the telephone 2 weeks after the UCLA-Louisville game and told that the experimenter was conducting research on the psychology of gambling. Both experimenters involved in this study were blind to the hypothesis of the experiment. The purpose of the call, the experimenter explained, was to assess the popularity of betting on sports events on the Stanford campus, information that was supposedly needed for a future study. Thus, the subjects did not know they were participants in an actual experiment. The experimenter explained that he was particularly interested in whether students followed and bet on college basketball games. The subjects were then asked the following questions: (1) Do you follow college basketball at all? (2) Did you follow the NCAA playoffs this year? (3) Did you see the Louisville-UCLA game on TV? If a person answered no to any of these questions, he was not included in the experiment. Of those subjects who answered yes to all three questions (N = 64), the experimenter proceeded to ask the following questions: (4) Who did you root for in that game, Louisville or UCLA? (5) Did you bet on the game? (6) Do you mind if I ask you how much you bet on that game? The subject's answer to Question 4 assigned him to one of the outcome conditions. The experimenter then consulted a random number table to assign students to either the fluke-salient or the fluke-not-salient-condition. Thus, the design of this experiment was a 2 × 2 factorial, with outcome crossed with salience of the fluke play.

For subjects in the fluke-salient condition, the experimenter proceeded to convey an impression of interrupting a set of prepared questions to incidentally ask:

By the way, what did you think of the breakaway lay-up that Kiki Vandeweghe missed near the end? Do you think he was fouled like he said he was? When you consider that if he had made that basket UCLA would have led by six with only about two minutes to play, there was a lot of money riding on that one basket.

This interjection by the experimenter served to make salient the flukish nature of the outcome of this game without having subjects realize that this was part of an experiment. The experimenter then returned to the regular interview protocol and asked a series of questions that constituted the dependent measures. For subjects in the fluke-not-salient condition, the experimenter did not stray from this interview format but simply led right into the dependent measures. These questions included the following: (7) If these same two teams were to play a new game tomorrow, who do you think would win?; (8) Would you bet on that game?; (9) How much would you want to bet on that game?; (10) Let me ask that question in a different way. If UCLA and Louisville were to play a series of 10 games starting tomorrow, how many do you think UCLA would win and how many do you think Louisville would win?

Results

The most direct test of the hypothesis was provided by subjects' predictions of the outcome of a rematch between UCLA and...
Louisville. These data, presented in Table 2, provide strong support for the hypothesis: Manipulating the salience of Vandeweghe’s missed shot had a much greater effect on UCLA fans than on Louisville fans. Seventy percent of the UCLA fans who were reminded of this play, but only 23% of those who were not reminded, thought that UCLA would win. In contrast, 100% of the Louisville fans who were reminded of this play and 90% who were not reminded thought that Louisville would win.

The significance of these effects were analyzed by converting these proportions to arc sines (\(F = 2 \arcsin \sqrt{p}\)) and then performing a \(2 \times 2\) analysis of variance (ANOVA) on the transformed data. This analysis revealed a significant main effect for outcome, \(F(1, \infty) = 40.30, p < .001\); a significant main effect for the nature of the outcome, \(F(1, \infty) = 19.31, p < .001\); and a significant interaction, \(F(1, \infty) = 3.87, p < .05\). Of greatest importance to the hypothesis was the interaction. This interaction was due to a large difference between the two UCLA conditions \((z = 3.01, p < .001)\) and no difference between the two Louisville conditions \((z < 1)\).

Similar results were obtained for subjects’ predictions about a hypothetical 10-game series between these two teams. These data—presented in Table 2 as subjects’ predictions of the number of games that their team would win in the series—were analyzed by a \(2 \times 2\) unweighted-means ANOVA. This analysis revealed a significant main effect of outcome, \(F(1, 59) = 71.78, p < .001\), and a significant interaction between outcome and the nature of the outcome, \(F(1, 59) = 6.86, p < .02\). The main effect for the nature of the outcome was not significant, \(F(1, 59) = 1.82\). Again, of greatest importance to the hypothesis was the interaction. As can be seen in Table 2, this interaction resulted from a large difference between the two UCLA conditions, \(t(59) = 3.41, p < .001\), and no difference between the Louisville conditions \((t < 1)\).

Finally, the hypothesis was also supported by subjects’ stated willingness to bet on the hypothetical rematch between these two teams. Table 2 presents the adjusted mean bets on this rematch by condition. To control for differences in the amounts that individual subjects were predisposed to bet on such games, each subject’s bet on the rematch was adjusted by dividing by the amount he had bet on the actual NCAA championship game. A \(2 \times 2\) unweighted-means ANOVA of these adjusted bets revealed a significant main effect for outcome, \(F(1, 60) = 7.19, p < .01\), and a significant interaction, \(F(1, 60) = 4.09, p < .05\). The main effect for the nature of the outcome was not significant, \(F(1, 60) = 1.50\). As with the prior measures, the interaction was due to a large difference between the two UCLA conditions, \(t(60) = 2.78, p < .01\), and no difference between the two Louisville conditions \((t < 1)\). Stated in another way, there

Table 2

| Measures of Subjects’ Expectations About the Outcome of One or More Rematches Between the University of California, Los Angeles (UCLA) and the University of Louisville | Nature of the outcome |
|---|---|---|
| % predicting victory for their original team | Fluke salient | Fluke not salient |
| Win (Louisville) | 100 | 90 |
| Loss (UCLA) | 70 | 23 |

Mean numbers of wins predicted for their original team

<table>
<thead>
<tr>
<th>Win</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.92</td>
<td>5.15</td>
</tr>
<tr>
<td>7.30</td>
<td>3.95*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adjusted mean bet on original team</th>
<th>Win</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.87</td>
<td>2.94</td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>-1.65</td>
<td></td>
</tr>
</tbody>
</table>

Note. The number of subjects in each condition was as follows: win/fluke-salient = 12; win/fluke-not-salient = 10; loss/fluke-salient = 20; loss/fluke-not-salient = 22.

* This mean is based on the responses of 21 subjects. One subject did not provide an answer to this question.

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6 When computing the \(F\) ratio on the transformed proportions, the denominator consists of a theoretical error variance derived from \((\Sigma, I/n_i)/K\), where \(K\) is the number of cells in the design. Thus, the error variance is not estimated from the data and has infinite degrees of freedom (cf. Langer & Abelson, 1972).

7 Of course, the adjusted bets of those subjects who switched their bets from one team to another (e.g., from betting on UCLA in the real game to Louisville in the hypothetical rematch) were counted as negative.
was a significant effect of outcome in the fluke not salient conditions, $t(60) = 3.46, p < .001$, but not in the fluke salient conditions ($t < 1$).

Discussion

The results of this experiment provide clear support for the hypothesis: Manipulating the salience of a critical fluke play had a much greater impact on those subjects whose team had lost the game than on those whose team had won. Making this play salient tended to restore the faith of losing subjects in their team without decreasing the faith of winning subjects in theirs. These effects were obtained on subjects’ predictions about one or more rematches between the two teams and their stated willingness to bet on such a rematch. Thus, these results complement the findings of Experiment 1 and provide further support for the general thesis that gamblers process outcome information in a biased manner.

Experiment 3

This study was designed to replicate and extend the findings of Experiment 2. The most important difference between these two studies was that Experiment 3 involved a manipulation of whether a fluke play had occurred and not a manipulation of the salience of an invariant fluke event. Thus, one could be confident that within each condition, all subjects were responding to the same information. In addition, the present study utilized direct measures of the biased evaluation of outcome information. Specifically, subjects rated the extent to which they thought the critical outcome was due to luck or due to the relative abilities of the two teams involved. Finally, this experiment differed from the last one in that subjects bet with real money.

The design of this experiment was the same as that used in Experiment 2—a $2 \times 2$ factorial, with outcome (win/loss) crossed with the nature of the outcome (fluke/no-fluke). The paradigm consisted of having subjects bet on professional football games. To be able to manipulate whether the critical outcome contained a fluke event, the games that subjects bet on were from a past NFL season. The season in question, 1965, was far enough in the past that there was little chance that the subjects would remember any of the games. As in Experiment 2, it was hypothesized that the fluke manipulation would greatly influence the subsequent bets of losing subjects but have little impact on winning subjects.

Method

Subjects: The subjects were 49 male students and staff members from Stanford University. To ensure that the subjects would be knowledgeable about professional football, they were recruited in two ways. One third of the subjects responded to an ad in the student newspaper seeking people who bet on professional football. The remaining subjects were team captains of intramural sports teams and were contacted over the telephone. Three additional subjects were excluded from the experiment, one because of suspicion and the others because of failure to follow instructions.

Overview: The subjects were asked to bet on the outcome of a selected game from each of several weeks of a past NFL season. Their bets and the outcome of the first game, between the Baltimore Colts and the Cleveland Browns, constituted the independent variables for this experiment. Subjects bet on either Baltimore or Cleveland, thus assigning themselves to the win or loss condition, respectively. After placing their bets, subjects read one of two bogus newspaper write-ups of this game and were thereby randomly assigned to either the fluke or the no-fluke condition.

In both the fluke and no-fluke write-ups, the final outcome and general course of the game were the same. Specifically, Baltimore was described as trailing Cleveland for nearly all of the game until, behind 14–13 with just 8 minutes left to play, they scored two quick touchdowns to win the game, 27–14. In the fluke version, Baltimore’s two touchdowns were the result of fortuitous circumstances, the first stemming from a fumbled punt by Cleveland and the second coming after a fumbled handoff between Cleveland’s quarterback and center. In contrast, the no-fluke version described these touchdowns as the result of Baltimore’s vastly superior performance during the game’s last 8 minutes: Both scores were described as perfectly executed drives to the end zone.

The effects of the experimental manipulations were assessed on subjects’ bets on a rematch between these teams 2 weeks later in the season. All bets involved real money. Subjects were allowed to bet up to $1 on each game from the $3 that they were to receive for participating in the experiment.

Procedure: Subjects were run in groups of one to six. They were told that they would be betting on a selected game from each of Weeks 9 through 14 of a past NFL season. In actuality, they only made bets on games from Weeks 9, 10, and 11. This deception was necessary to prevent subjects from realizing that the main focus of the experiment was the relation between their bets on
Table 3  
Mean Attribution Index for the First Cleveland-Baltimore Game  

<table>
<thead>
<tr>
<th>Nature of the outcome</th>
<th>Fluke</th>
<th>No fluke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Win</td>
<td>3.36b</td>
<td>6.40b</td>
</tr>
<tr>
<td>Loss</td>
<td>-1.30c</td>
<td>6.80b</td>
</tr>
</tbody>
</table>

Note. Positive numbers indicate greater attributions to the relative abilities of the two teams; negative numbers indicate greater attributions to luck. Means with different subscripts differ significantly at least at the .05 level.

the two Cleveland/Baltimore games. The subjects were not told from which season these games were selected; they were only told that the season was sufficiently long ago that they would probably be unable to recall the outcomes of any specific games.

To enable subjects to make informed bets on these games, they were given two sources of information. First, they were given a fact sheet summarizing the previous season, 1964. This sheet contained a list of players on the NFL all-star team, the final standings of all NFL teams, and the outcome of the NFL championship game for that year. Second, subjects were given a booklet containing authentic newspaper write-ups of all the games from the first 8 weeks of the 1965 season. These write-ups were copied from past issues of The New York Times.

After examining this information for 20-30 minutes, the subjects were told on which game they were to make their first bet, supposedly a selected game from Week 9. In reality, the selected game for that week never took place. This game was the aforementioned contest between the two division-leading teams, the Cleveland Browns and the Baltimore Colts. The subjects were then given 5 minutes to review all the information relevant to these two teams, indicate on which team they wanted to bet, and answer several questions constituting additional dependent measures.

After the subjects answered all questions concerning that week's bet, they were given write-ups of the game to see how their bet had come out. Within each group, some subjects were randomly given the fluke version of the write-up and some were given the no-fluke version. After reading the write-up of the game, subjects answered several questions about the outcome and its causes.

This procedure was repeated for each of the next 2 weeks' games—the first being a game between two different teams, Pittsburgh and Washington, and the second a rematch between Baltimore and Cleveland. Like the first Baltimore/Cleveland game, the rematch did not actually take place. As soon as the subjects indicated their bets and answered the relevant questions for the rematch, the experiment was terminated. The subjects were carefully questioned to ascertain any suspicions, thoroughly debriefed, and paid for their participation.

Dependent measures. The primary measure of the effect of the fluke/no-fluke manipulation was provided by subjects' bets on the rematch between Cleveland and Baltimore. These bets were adjusted to control for individual differences in the amount of money subjects were predisposed to bet on such games. A cruder measure was provided by the percentage of subjects in each condition who continued to bet on their original team during the rematch. In addition, two nonbetting measures were obtained: Subjects predicted the score of each game and indicated how confident they were that they would win each bet. The predicted scores and levels of confidence for the rematch were adjusted in the same manner as subjects' bets (see Footnote 9). Another set of measures was provided by the attribution questions that subjects completed after reading about the outcome of the first game. These measures consisted of 15-point scales that assessed the extent to which subjects thought the outcome was due to luck and the extent to which they thought it was due to the relative abilities of the two teams involved.

Results

Attribution measures. Because the two attribution measures were highly negatively correlated ($r = - .58$), they were combined into one luck/ability index by subtracting subjects' attributions to luck from their attributions to ability. Thus, higher scores indicate a greater tendency to view the outcome as more the result of Baltimore's superiority than of fortuitous circumstances. These data are presented in Table 3.

Considered as a manipulation check, these data reveal that the fluke/no-fluke manipulation was effective in leading subjects in the fluke conditions to consider the outcome to be less the result of ability and more the result of luck than subjects in the no-fluke conditions, $F(1, 45) = 26.12, p < .001$. Given the success of the fluke/no-fluke manipulation, one can ask whether the nature of the outcome had a greater effect on losing subjects than on winning subjects.

As in Experiment 2, subjects' bets on the rematch were adjusted by dividing by the size of their bets on the original Cleveland/Baltimore game. The adjusted bets for those subjects who had switched bets from one team to another were then counted as negative.

The decision to use a contrived game stemmed from the need to make this bet as interesting and involving to the subjects as possible. A contest between the two division-leading teams was one of the best ways to generate such involvement. In addition, a game between these two teams involved a classic match between a cagey quarterback (Johnny Unitas) and an unstoppable fullback (Jim Brown). It was presumed that a game involving such classic elements would allow subjects to picture, perhaps rather vividly, how the game might unfold and thus make the game more involving for the subject.

As in Experiment 2, subjects' bets on the rematch were adjusted by dividing by the size of their bets on the original Cleveland/Baltimore game. The adjusted bets for those subjects who had switched bets from one team to another were then counted as negative.

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Some preliminary support for this hypothesis was provided by these same attribution data. A close inspection of Table 3 reveals a significant interaction between outcome and the nature of outcome, \( F(1, 45) = 5.86, p < .02 \). The source of this interaction was a significant difference between winners and losers in the fluke condition, \( t(45) = 3.29, p < .005 \), but not in the no-fluke condition \( (t < 1) \). These data suggest that subjects in the loss/fluke condition (who had bet on Cleveland) tended to attribute the outcome to the "breaks" that went Baltimore's way, whereas subjects in the win/fluke condition (who had bet on Baltimore) were more apt to discount their significance.

**Primary dependent measures.** The primary test of the hypothesis was provided by subjects' adjusted bets on the rematch between Cleveland and Baltimore. These data are presented in Table 4. An unweighted-means ANOVA performed on these data reveals clear support for the hypothesis: There was a significant main effect for outcome, \( F(1, 44) = 4.31, p < .05 \), and a significant interaction between outcome and the nature of the outcome, \( F(1, 44) = 4.18, p < .05 \). The main effect for the nature of the outcome was not significant, \( F(1, 44) = 1.47 \). As predicted, the interaction was due to a significant difference between the two loss conditions, \( t(44) = 2.25, p < .05 \), but no difference between the two win conditions \( (t < 1) \). Looked at in another way, there was a significant effect of outcome in the no-fluke conditions, \( t(44) = 2.90, p < .01 \), but not in the fluke conditions \( (t < 1) \).

Similar, though less reliable, patterns of data were provided by the other measures of subjects' expectations about the rematch. On all three measures there were relatively large differences between the two loss conditions and very little difference between the two win conditions. On none of these other measures, however, was this interaction significant.

**Secondary findings.** To determine whether the biases observed in this experiment were more pronounced for certain types of subjects than for others, the following internal analysis was performed. At the beginning of the experiment, subjects indicated on a 14-point scale how important it was to them to be effective football bettors. The endpoints of this scale were labeled "not important at all" and "very important." On the basis of a median split of their responses to this scale, subjects were divided into those who were psychologically invested in the betting task and those who were relatively uninvested. Differences between these two groups of subjects were assessed on the simplest dependent measure, the percentage of subjects in each group who bet on their original team during the rematch.

The results of this analysis, presented in Table 5, provide two important insights. First, there was a significant main effect for whether subjects were psychologically invested in the betting task. Highly invested subjects tended to stick with their original team—across all conditions—more than subjects who were relatively uninvested, \( F(1, \infty) = 20.42, p < .001 \). In other words, highly invested subjects were more likely to evaluate the outcome in a manner that favored their...
THOMAS GILOVICH

Table 5: Percentage of Subjects Who Bet on Their Original Team During the Rematch by Experimental Condition and Subjects’ Psychological Investment in the Betting Task

<table>
<thead>
<tr>
<th>Outcome</th>
<th>High investment</th>
<th>Low investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Win</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>No fluke</td>
<td>82</td>
<td>44</td>
</tr>
<tr>
<td>Fluke</td>
<td>50</td>
<td>44</td>
</tr>
<tr>
<td>No fluke</td>
<td>75</td>
<td>25</td>
</tr>
</tbody>
</table>

Note: Subjects in the high-investment condition were those who had a score of 5 or higher on the 14-point scale assessing how important it was to the subject to be an effective football bettor.

Discussion

The findings of this experiment replicate and extend those of Experiment 2. As in the last study, only those subjects who had lost their bet and could not readily blame the loss on one or more fluke events tended to lose confidence in their original team. Winning subjects, and losers provided with an opportunity to discount their loss, remained confident in the future performance of their team. Thus, the fluke events were apparently seized upon by losing subjects to explain away their loss; winning subjects, on the other hand, were unaffected by these events. These findings were reinforced by the attribution measures. Subjects in the loss/fluke condition saw the outcome as more of a fluke than subjects in the win/fluke condition. Finally, these effects were observed in an experiment in which real money was wagered.

One of the more intriguing results of this study was that the predicted bias was found only for those subjects for whom it was important to be an effective football bettor. Though acknowledging the interpretative problems associated with any internal analysis, this finding suggests that this experiment actually underestimates the extent to which bettors in the real world evaluate outcomes in a biased manner. It would seem that the bias observed in this experiment would have been more pronounced had the experiment involved only subjects who were psychologically invested in being effective bettors, precisely the type of people who actually gamble in the real world.

General Discussion

The three studies reported here provide consistent evidence that gamblers do not evaluate the outcomes of their bets even-handedly. Rather, they seem to be attuned to how things could have turned out differently for their losses but not for their wins. Subjects in the first experiment spent more time explaining their losses and were more likely to discount them. Subjects in the last two studies revealed a tendency to seize upon random or fluke events that contributed to a loss but to be unaffected by identical events that contributed to a win.

The implications of these findings should be clear. This tendency to accept wins at face value but to transform losses into “near wins” can produce overly optimistic assessments of one’s gambling skill and the chances of future success. Spurred on by such inflated expectations, gamblers may continue to engage in unrewarding gambling activities. Thus, this tendency to evaluate outcomes in a biased manner can be seen as an important determinant of why people continue to gamble despite persistent losses.

One question that can be raised about the present research is whether the same effects would be found for those gambling ventures in which losses are not so easily explained away. It is no doubt true that the present analysis is more appropriate for some gambling activities than others. The outcomes of sporting events are particularly easy to discount because the ebb and flow of the contest often provides a rich source of information with which one can justify why the outcome should have been different. In contrast, the outcomes of most casino games—like rou-
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little help in resolving this issue. Several studies (Lau & Russell, 1980; Pyszczynski & Greenberg, 1981; Wong & Weiner, 1981) have shown that people dwell more on unexpected outcomes than expected outcomes, whereas one of them (Wong & Weiner, 1981) also found an independent tendency for people to focus more on failure than success.

Unfortunately, the relevant data from the present experiments are also less than informative. At first glance, the lack of a significant correlation in Experiment 1 between the amount of time subjects spent explaining their losses and their initial confidence that they would win those bets would seem to be quite damaging to the cognitive interpretation. However, the lack of such a correlation may be misleading. Since subjects were allowed to bet on the five or more games that they were most sure of winning, they may have been quite confident about winning each of their bets. Given such little variation in confidence levels, the lack of a significant correlation between these two variables may not be informative. Perhaps an examination over a wider range of confidence levels would reveal a significant relation between initial confidence and the amount of time spent reexamining an outcome.

In a similar manner, the results of the internal analysis performed in Experiment 3—in which subjects who were psychologically invested in the betting task were shown to be particularly likely to evaluate outcomes in a biased manner—might also appear to support a motivational interpretation of the present findings. According to such an interpretation, psychologically invested bettors are less able to tolerate the conclusion that their betting strategies are deficient and thus are motivated to explain away their losses. With a little thought, however, these results can also be interpreted in purely cognitive terms. One could argue that the scale that assessed psychological investment may also have measured expertise. Those subjects for whom it was important to be effective bettors may have bet more often in the past. If so, then the observed results may simply have occurred because the more experienced bettors had stronger expectations about the outcomes of their bets and thus evaluated those outcomes in a more biased manner.

Biarrett or keno—involves little more than chance and are presumably more difficult to discount. Thus, we might expect gamblers to be more biased with respect to the outcomes of football games than the outcomes of bets on roulette, for example.

Nevertheless, it is important not to underestimate people's ability to explain away undesirable outcomes. As research on the illusion of control (Langer, 1975) has demonstrated, people often infuse chance activities with properties of skill and controllability. Thus, people may occasionally explain away losses in purely chance activities by citing such factors as lapses in concentration, bad dealers, or "off" nights. In fact, it is fairly common to hear card players blame their lack of success on the presence of a novice player who, not knowing the proper plays, accidentally takes all of "their" good cards. However, the gambler's ace in the hole when it comes to explaining away negative outcomes in games of chance consists of citing some point in time when one was winning and should have stopped playing. Since it is quite common for gamblers to be momentarily ahead of the house, they should find it rather easy to discount an unfortunate pattern of outcomes in almost any gambling activity.

A more important question about the present research concerns the mechanisms responsible for the observed biases. Not surprisingly, this question raises the ubiquitous motivation-versus-cognition controversy. In particular, one could readily account for the present data through either motivational or purely cognitive processes. According to the motivational interpretation, people are motivated to explain away or dismiss their losses to maintain self-esteem or a sense of "effectance" (White, 1959). Cognitive theorists, on the other hand, would argue that the observed biases are simply the result of very rational processes of dealing with information that is consistent or inconsistent with one's expectations (Miller & Ross, 1975). Implicit in this controversy is the question of whether the observed biases stem from an asymmetry in the evaluation of wins and losses per se or whether they derive indirectly from a bias in the evaluation of confirmed and disconfirmed expectancies. Previous studies in the attribution literature provide
Putting aside this motivation-versus-cognition controversy, it is important to consider the implications of this research beyond the domain of gambling. One can readily think of examples in which the average person, much like his or her gambling counterpart, appears to be trapped in a pattern of unrewarding or dysfunctional behavior. One such example is the chronically unsuccessful small businessperson who starts up one enterprise after another, continually dismissing earlier failures as the result of such unusual circumstances as changes in municipal zoning, dramatic increases in interest rates, or the unethical business practices of corporate giants. Similar behavior can be observed in amateur inventors, would-be top executives, and even scientists. In each case the application of the present formulation is straightforward. People begin various endeavors with an expectation of success and with a set of strategies designed to bring about that success. After engaging in the behavior dictated by these strategies, they receive feedback as to their effectiveness. By evaluating such feedback in a biased manner, however, people may fail to recognize when such strategies are ineffective and thus may persist in patterns of unrewarding behavior.

In a slightly different manner, the present formulation can be applied to a more pernicious example of dysfunctional behavior, the phenomenon of learned helplessness (cf. Abramson, Seligman, & Teasdale, 1978; Seligman, 1975). Helpless individuals are characterized by a belief that their actions are independent of subsequent outcomes. Thus, helpless individuals may fail to recognize when they can have, or even have had, an effect on the environment. In terms of the present formulation, such people may explain away evidence of their control over the environment and readily accept evidence of their lack of control. Indeed, Diener and Dweck (1980) found that helpless children tend to discount their successes. This finding complements earlier research demonstrating that helpless individuals attribute failure to hard-to-overcome factors such as a lack of ability (Diener & Dweck, 1978).

When examined from the present perspective, learned helplessness may be viewed not as a unique malady but as one manifestation of a broader tendency for people to evaluate outcomes in a manner biased by their expectations. Helpless individuals have acquired the belief that they cannot perform a broad class of activities, and they evaluate new information in a way that reinforces that belief. Thus, helpless people may, perhaps paradoxically, have a lot in common with mastery-oriented individuals (Dweck, 1975; Dweck & Repucci, 1973; Weiner, 1972, 1974) and high need achievers (cf. Weiner, 1972)—two groups of people who evaluate outcomes in a manner biased by their expectations of achievement and success. As a result, all of these patterns of behavior are perhaps best understood not as isolated phenomena but as related results of processing new information in light of prior expectations.

This general bias of evaluating new information in light of prior beliefs can sometimes be normatively justified and sometimes not (cf. Cohen, 1979; Kahneman & Tversky, 1979; Nisbett & Ross, 1980; Ross & Lepper, 1980). Regardless of its justification, the bias at times proves to be fortunate, and at other times unfortunate. Our society as a whole tends to focus more on the fortunate consequences, as we constantly extol the virtues of perseverance and resoluteness. The present research, however, serves as a rare counterweight: The same biases that at times result in triumphant perseverance can also lead to the destructive persistence of the chronic gambler.

Reference Notes

References
Anderson, C. A., Lepper, M. R., & Ross, L. Perseverance of social theories: The role of explanation in the per-
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