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Anecdotal evidence indicates that in a gambling environment, consumers may end up betting more than they had initially planned. The authors assess this phenomenon in a series of three experiments, in which people are exposed to sequential and fair gambles in a two-stage process (planned and actual bets). The results show that in the planning phase, people behave conservatively, betting on average less after an anticipated loss and the same amount after an anticipated gain. However, after experiencing an actual loss in the first gamble, people bet in a subsequent gamble significantly more than they had initially planned, whereas on average, there were no observable differences from the plan after an actual gain. The reason for such asymmetry is due in part to people's tendency to underestimate, at the planning phase of the gamble, the impact of negative emotions in betting decisions during the actual phase of the gamble.

Keywords: gambling, risk taking, emotions, affect, affective forecasting

Planned Versus Actual Betting in Sequential Gambles

Consider the following scenario: A couple buys a weekend package to Las Vegas. It is their first time in the city, and they are looking forward to having some fun in the most famous casinos in the world. Because both have heard stories about overspending, they decide to make a plan. They agree that they should visit the casinos on only two nights and chip $200 per night at most. On their way home after the trip, they wonder what went wrong and why they spent so much more than they had initially planned.

From Hollywood to Dostoyevsky, we have been frequently exposed to stories in which gamblers have lost a blouse, a house, and, sometimes as a result, a spouse at the gambling table. Moreover, given the growth of the industry—from casinos to Internet gambling—the size and scope of the phenomenon might have increased exponentially in the past decades. In the early 1980s, U.S. casinos were concentrated mainly in Nevada and New Jersey. By 2006, 37 states had at least one commercial, racetrack, or tribal casino available. Consumer spending increased in every single state in that same year as the expenditure bar hit its all-time high of $32.5 billion. Americans spent more money in commercial casinos than they did on books ($16.1 billion) and movie tickets ($12.3 billion) combined. In addition, the magnitude of spending is clearly not due to a handful of heavy gamblers. It is estimated that more than one-quarter of adult Americans visited a casino in 2006 (American Gaming Association 2007). In addition, if our opening scenario holds any truth, it is likely that many such visitors ended up spending more than they had initially planned.

Indeed, recent evidence from the gaming industry seems to suggest that people are bad planners when it comes to gambling. Through a loyalty-card program called "Total Rewards," Harrah's is now able to track betting patterns at the individual level and, as a result, make predictions about its customers' future betting behavior (Ayres 2007, p. 30). A lesson from the data is that when a customer overbets and incurs losses beyond a given threshold (labeled "pain points"), the likelihood that he or she will return to a Harrah's casinos in the future is significantly reduced. To address this issue, the company has developed the "luck ambassadors" program—specialized employees whose job is to approach unlucky clients and offer, in an informal chat, a pleasant break (e.g., a free dinner at one of Harrah's

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restaurants) to encourage them to stop gambling. The company reasons that managing customers in this way in the short run might be profitable in the long run.

Note that from a decision-making perspective, the luck ambassador rationale suggests (1) that people have a difficult time predicting future betting behavior in a gambling environment (i.e., how much they are willing to lose before stopping), (2) that they actually need help to stop gambling after they experience losses, and (3) that a pleasant intervening incident seems required to replace the negative experience generated by the losses; otherwise, they might not stop gambling. A skeptic might argue that such a phenomenon is more likely to represent the behavior of pathological gamblers and that, in general, nonpathological ones (i.e., the great majority of consumers) are good at planning what they will do in case luck turns against them.

We address this matter in an experimental setting, in which participants are exposed to sequential and fair gambles in a two-stage process (planned and actual bets). We raise three basic questions. First, do consumers deviate from the plan even when full information about the characteristics of the gambles is made available a priori? A common explanation for betting and eventually losing more than planned is simply that at the planning phase, people do not have as much information about the consumption opportunities. For example, consumers who visit Las Vegas for the first time are often unaware of the types of games, prices, social interactions, and number and availability of casinos, among other characteristics inherent to the gambling experience. Therefore, learning could explain why plans are eventually revised. However, this would imply that as information about the consumption opportunities becomes fully available, inconsistencies between plans and subsequent actions should disappear. In gambling scenarios, however, anecdotal evidence suggests that even experts, who presumably have information about the gambles and the surrounding environmental cues, behave in a manner that often leads them to lose much more than they had initially planned. Thus, we test the prevalence of this effect in a scenario in which (1) full information about the characteristics of the gamble is provided before a planning phase (i.e., trial phase), (2) the period between the planning and the actual phases of the gambles is short (approximately one minute), (3) participants believe that their plans will be executed, and (4) a reminder of the planned bet appears right before the actual bet.

Second, if deviations from the plan indeed take place in such a scenario, what is the shape of the deviations? In other words, do people bet more or less than originally planned, and does the bet vary as a function of the outcome in the previous gamble? We investigate the magnitude, frequency, and direction of the deviations.

Third, we discuss the underlying reasons for potential deviations: If full information about the characteristics of the gamble and surrounding cues (or lack thereof) is provided before the planning phase, why would people deviate from it just a few minutes later, even when they are explicitly reminded of it before the actual betting? Along the same lines, can we prevent them from deviating from the plan?

We address these questions in a series of three experiments, in which participants are presented with a sequence of three (Experiment 1) or two (Experiments 2 and 3) gambles and are asked to make a betting plan per gamble contingent on previous outcomes (e.g., "How much will you bet in Gamble 2 in case you win/lose Gamble 1?"). This enables us to assess the existence and shape of these deviations and the potential underlying mechanisms.

CONCEPTUAL BACKGROUND

Planning is a common consumer practice. Consumers plan how much to spend on a trip, how much to save for the month, and how much to eat at lunch. Nonetheless, they also seem to revise as frequently as they plan (Baumeister, Heatherton, and Tice 1994). They eat (Wardle and Beales 1988), drink (Allsop and Saunders 1989), and smoke (Marlatt and Kaplan 1972) more than they had initially planned. A common explanation is simply that during the planning phase, people do not have as much information about the consumption opportunities. If this is the case, as long as enough information is provided before planning, deviations should be less likely. However, in a gambling environment, anecdotal evidence suggests that even experts, who presumably have good information about the characteristics of the gambles and surrounding environmental cues, often overbet and thus lose much more than they had initially planned. However, if deviations from the plan indeed take place, two questions arise: (1) What would be the pattern of such deviations? and (2) What could explain such deviations?

Unanticipated Impact of Changes in Subjective Probabilities

If probabilities are subjective, their assessments may vary as a result of an anticipated (i.e., planned) versus an experienced (i.e., actual) sequence of events. Of particular interest is the so-called gambler's fallacy, which pertains to the mistaken belief that the subjective probability of a given outcome is lower after this outcome is experienced in a previous gamble, even though the successive gambles are statistically independent. This fallacy relies on the flawed assumption that chance is a self-correcting process. Evidence for the gambler's fallacy is well documented and ranges from lottery games (Clotfelter and Cook 1993; Terrell 1994) to horse races (Metzger 1985). Along the same lines, casinos often display records of previous wins (e.g., roulette), even though it is well known that each play is independent. If we assume that the gambler's fallacy phenomenon requires the actual outcome to be revealed, people will not be susceptible to such an erroneous belief during the planning phase. The fallacy would take place only at the actual phase of the gamble. That would be one explanation for potential deviations from the plan. Moreover, specific predictions can be derived in a scenario in which participants must plan and play a sequence of gambles. The subjective probability of a gain should increase after an actual loss. As a result, higher-than-planned bets (i.e., positive deviations) should become more likely and/or more significant in magnitude. Similarly, the subjective probability of a loss should increase after a gain is realized. As a result, lower-than-planned bets (i.e., negative deviations) should become more frequent and/or more significant in magnitude. In short, a gambler's fallacy rationale would predict reversed deviations from the plan—that is, people should bet more than planned after a loss and bet less than planned after a gain.

Unanticipated Impact of Shifts in Reference Points

In addition to the perceived changes in probabilities, it has been argued that people may fail to account for the impact of shifts in reference points on their risk preferences. Relying on prospect theory (Kahneman and Tversky 1979), Barkan and colleagues (see Barkan and Busemeyer 1999, 2003; Barkan et al. 2005) provide a more specific characterization of how shifts in reference points might affect future behavior in sequential gambles. In a nutshell, the authors suggest that when planning a sequence of gambles, people treat each gamble independently, which leads to no change in reference points (i.e., when planning a second bet, people are not influenced by the outcome of the first planned bet). During the actual gambles, however, people integrate the outcome of a previous gamble into their decision-making process on subsequent bets. As a result, shifts in reference points take place because of gains and losses, and the subsequent bets deviate from initial plans. According to Barkan and colleagues, this rationale has two implications. First, when planning bets in sequential gambles, the anticipated outcome of the first gamble should not influence planned bets for the subsequent gamble, because people should treat both gambles independently. Second, during the actual gamble, the predictions, they argue, would be consistent with prospect theory. When losses are experienced in the first gamble, people should become more risk seeking—that is, positive deviations from the plan become more likely in a second gamble. However, when gains are experienced in the first gamble, people should become more risk averse—that is, negative deviations from the plan become more likely in a second gamble. In short, as in the case of the gambler's fallacy, Barkan and colleagues predict reversed deviations from the plan.

To test these hypotheses, Barkan and Busemeyer (2003) asked participants to plan and play several times a sequence of two gambles (the gambles varied in expected value). The first gamble was always mandatory. Participants indicated their preferences on whether to take the second gamble before ("If I win the first gamble, I will take/reject the second gamble") and after ("I will take/reject the second gamble") the outcome of Gamble 1. The findings show that losses and gains did not produce any differences in subsequent bets during the planning phase. In other words, participants seemed to treat the gambles independently at this stage. Moreover, after Gamble 1, participants were more likely to "reject" Gamble 2 after a gain and to "take" Gamble 2 after a loss, showing reversed deviations from the plan. Thus, people's inability to anticipate shifts in reference points might be because during a planning phase, people assess their betting decisions independently, whereas integration, which leads to changes in risk attitudes, takes place after the actual realization of the first outcome.

Unanticipated Impact of Emotions

Another complementary account suggests that people might not be able to anticipate the impact of their emotions on future betting decisions. Loewenstein and Adler (1995) provide evidence that is consistent with this rationale. They show that when participants are asked to make predictions on the selling price for an object they did not own (hypothetical ownership), they indicated lower selling prices than when they owned the object (real ownership). The reason for a "weakened endowment effect" in the hypothetical relative to the real ownership scenario is that in the former, participants had a difficult time incorporating the impact of loss aversion into the selling price. Why are people so bad at incorporating the impact of loss aversion in a hypothetical scenario? Loewenstein and Adler speculate that emotions play a role: "To provide a selling price for a good one does not possess requires two stages of introspection: (1) imagining one possesses the object and has adapted to ownership, and (2) imagining how one would *feel* about parting with it" (p. 936, emphasis added). Zhang and Fishbach (2005) find direct evidence that is consistent with this hypothesis. They show that relative to a control condition, the endowment effect became amplified (disappeared) when participants' negative (positive) emotions were orthogonally manipulated before the trading task. Ariely, Huber, and Wertenbroch (2005) also propose that emotional attachment represents a critical mechanism underlying the endowment effect. They describe several findings from previous research in which the endowment effect became intensified (mitigated) as people's level of emotional attachment to the object increased (decreased). Finally, Camerer (2005, p. 132) takes an even stronger stand and suggests that loss aversion itself "is often an exaggerated emotional reaction of fear, an adapted response to the prospect of genuine, damaging, survival-threatening loss." According to Camerer, this would explain why people usually overreact to small losses.

In short, an emotionally charged experience might lead to unexpected overreactions (e.g., higher selling prices for an object, higher-than-planned bets after losses). Such a rationale resonates with previous findings from the affect literature. It has been shown that when in a "neutral" emotional (cold) state, people fail to predict how they might feel and/or behave when they experience a stronger visceral (hot) state. This so-called hot–cold empathy gap (Loewenstein 1996) further suggests that when people are deprived of a given resource, the aversive state they experienced leads them to react and overdo in an attempt to restore a homeostatic state.[1] That would explain why hungry consumers buy more food than they initially planned (Gilbert, Gill, and Wilson 2002; Nisbett and Kanouse 1969), why curious people care more about the missing information than they initially predicted (Loewenstein, Prelec, and Shatto 1996), and why drug users underestimate the impact of craving (Badger et al. 2007). Although people have the opportunity to stop or keep their plans, empirical evidence shows that to reduce the current aversive state, people usually overreact (Loewenstein and Schkade 1999). Whether deprived of food, information, drugs, or money, people may respond and exaggerate in an attempt to reestablish the prior state.

Translated into a sequential gambling scenario, it is possible that the negative emotions generated by losses further induce people to overreact (i.e., positively deviate from the initial plan) in an attempt to restore a current affective state in the prospect of winning. Although people may cognitively think about a loss while planning a sequence of bets

[1]Loewenstein, O'Donoghue, and Rabin (2003) further generalize this phenomenon by arguing that people usually display a projection bias; that is, they overestimate how much their current preferences will resemble their future preferences.

and may draw inferences about its impact, they have more difficulty at the planning stage in affectively experiencing the pain, frustration, or disappointment associated with the loss and/or drawing inferences about its effect on their future betting behavior.

We can generate some specific hypotheses as a result of the foregoing discussion. First, when losses are observed in Gamble 1 and, as a result, negative emotions are felt, positive deviations take place in Gamble 2. Because no sense of deprivation is experienced for gains, no specific pattern of behavior is expected.[2] This would lead to asymmetric deviations from the plan. Second, if emotions play a role, the underestimation of the intensity of negative emotions after losses (between plans and actual) would lead to a higher propensity of positive deviations from the plan. That is, people who feel worse than they expected might be precisely those who are likely to bet more than they had planned. Finally, if the negative emotions associated with the loss are responsible for making people bet more in a subsequent gamble, we expect that when the negative emotions are replaced with positive ones, the magnitude and frequency of positive deviations should be mitigated, even if the financial loss in the previous gamble were to be the same relative to a control condition. In the next three experiments, we address these intuitions.

EXPERIMENT 1

In Experiment 1, we asked participants to make contingent plans and then play a sequence of three gambles. During the actual phase of the gambles, they were unexpectedly asked to confirm or revise their initial plans. Within such a framework, we are able to test, first, whether contingent plans are made in isolation (e.g., anticipated outcome of Gamble 1 has no influence on planned bets at Gamble 2) or whether they show serial dependence (e.g., anticipated outcome of Gamble 1 influences the betting amounts in subsequent planned bets). Second, we assess whether contingent plans are carried out or whether deviations take place when participants are provided with an opportunity to revise their planned bets in the actual betting phase. Finally, we identify the shape of the deviations (i.e., asymmetric or reversed).

Method

Participants and design. One hundred five students from a West Coast university participated in this experiment. They were paid a $9 flat fee plus additional earnings contingent on the outcomes of the gambles. For Gamble 2, the experiment employed a 2 (Bet 2: planned versus actual; within) × 2 (Outcome 1: gain versus loss; between) mixed design. For Gamble 3, the experiment employed a 2 (Bet 3: planned versus actual; within) × 4 (Outcomes 1 and 2: gain–gain versus gain–loss versus loss–gain versus loss–loss; between) mixed design.

Procedure. We conducted the experiment in a computer-based environment. The cover story stated that the study was about gambling preferences and that participants would be playing a series of three identical and fair gambles. Each gamble had a 50% chance of earning twice the amount of the bet and had a 50% chance of losing the bet, which implies EV = 0.

Participants came to the lab expecting to receive $15 for their participation in the experiment. Note that according to the lab policy, participants must indeed receive, on average, $15 for 45 minutes to 1 hour of participation in any experiment. At the beginning of the experiment, however, they were told that the experimenter had received authorization from the university to allow them to use up to $6 (60 "electronic" chips) of their $15 participation fee in the subsequent gambles. Thus, they were told that they could bet as much or as little as they wanted because the $6 represented their own, deserved money. Specifically, participants were told that they could bet any amount from $0 to $2 (0–20 chips) in each of the three gambles.

The procedure followed three steps: trial, planning, and actual phase. To provide participants with full information about the characteristics of the gamble, they were first asked to practice the gamble in a trial phase (no betting involved). Then, they were told that the gamble comprised two additional phases. During the planning phase, they would need to plan their bets in all three gambles. We used the term "precommitment" rather than "plan" to reinforce the belief that changes would not be allowed. At this point, participants were instructed that whatever decision they made during the planning phase would be carried over. Participants then chose the bet in Gamble 1 and were asked (1) to choose their bets in Gamble 2 in anticipation of a gain or a loss in Gamble 1 and (2) to choose their bets in Gamble 3 in anticipation of two gains, two losses, a loss–gain, and a gain–loss in the previous two gambles. Then, the actual phase started. To avoid memory decay effects, participants were reminded of their initial planned bet and then were unexpectedly informed that they could either confirm or revise the planned bet. They made the final bet in Gamble 1, and then the gamble started. The outcome was revealed after 15 seconds of flashing in the gambling board (we explain this in greater detail subsequently). Participants then wrote the outcome in a financial summary sheet, which we subsequently used to compute their final participation fee. They were then reminded of their planned bet in Gamble 2 and were asked—as in Gamble 1—to confirm or revise it. The same process repeated itself in Gamble 3. Finally, after a few final questions, participants were properly debriefed and thanked for their participation in the study.[3]

Gambles. The gambles had the following characteristics: A gambling board consisting of 20 red and 20 blue squares appeared on the screen (see the Web Appendix at http://www.marketingpower.com/jmrjune09). An "X" sign flashed randomly on the board every ½ second for 15 seconds. Each flash was independent of the previous one so that it could

[2]The hot–cold empathy gap does not directly address the positive side of the affective spectrum. Although positive feelings may well generate deviations—people's feelings at a planning phase differ from feelings during the actual gamble—the direction of the effect is not defined by the theory, especially when applied to economic decisions: "I restrict attention to negative emotions because their effects resemble those of drive states such as hunger and feeling states such as pain. The effects of positive emotions are more subtle and complex" (Loewenstein 2000, p. 426).

[3]In Experiments 1 and 2, we also obtained online measures of feelings during each gamble (during the 15-second flashing period). However, for the sake of parsimony, we do not report them here.

flash more than once in the same square. At the end of the 15-second period, the flashing stopped. If the "X" sign landed in a blue square, the participant would earn twice the amount of his or her bet; otherwise, he or she would lose the bet. The probabilities, payoffs, and the remaining time were displayed on top of the gambling board. To avoid potential objective mistakes, we constructed the board to present visual, easy-to-assess probabilities. Finally, to bring knowledge about this type of gambling to a common real-life baseline, participants were also told at the beginning of the experiment that the probabilities and payouts in the current gamble presented a slightly better deal than the black or red option in American roulette (which offers a 47.4% of winning in a one-to-one payout).

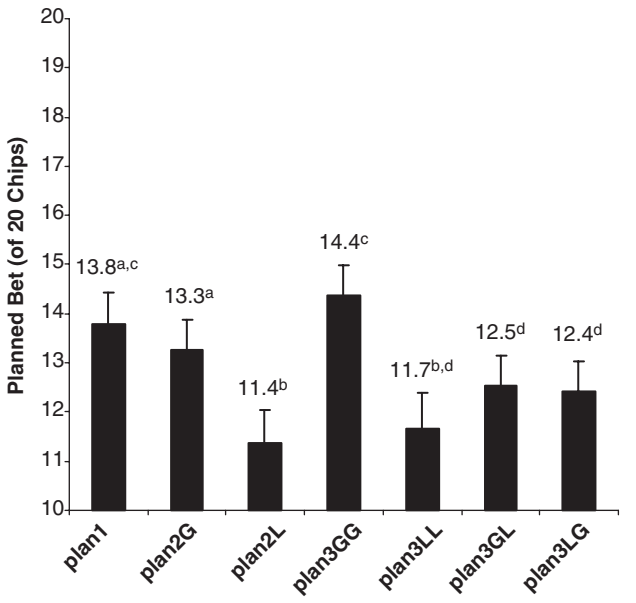
Results

Planning phase. Planned bets in Gamble 2 were lower in anticipation of a loss (versus gain) in Gamble 1 ($M_L = 11.4$ versus $M_G = 13.3$; $F(1, 104) = 11.32$, $p < .01$). Moreover, compared with their planned bets in Gamble 1 (M = 13.8), participants reported lower planned bets in Gamble 2 after an anticipated loss in the previous gamble ($F(1, 104) = 19.48$, $p < .001$), but they reported similar planned bets in Gamble 2 after an anticipated gain in the previous gamble ($F(1, 104) = 1.19$, $p > .10$). Similarly, the anticipated outcomes of Gambles 1 and 2 influenced subsequent planned bets in Gamble 3 ($F(1, 102) = 4.52$, $p < .01$). For example, planned bets in Gamble 3 were lower in anticipation of a series of two losses (versus two gains) in the two previous gambles ($M_{LL} = 11.7$ versus $M_{GG} = 14.4$; $F(1, 104) = 10.79$, $p < .01$). In addition, compared with their planned bets in Gamble 1 (M = 13.8), participants reported lower planned bets in Gamble 3 ($F(1, 104) = 11.30$, $p < .01$) after two anticipated losses in the previous gambles (see Figure 1).

Actual phase: Gamble 2. As we expected, there was no significant difference between the planned (M = 13.8) and the actual (M = 14.0) bet in Gamble 1 ($F(1, 104) = 2.09$, $p > .10$). Most important, there was an interaction of these two factors on betting preferences in Gamble 2 ($F(1, 103) = 7.28$, $p < .01$; see Figure 2).[4] On average, participants who won Gamble 1 bet the same amount they had previously planned to in anticipation of such gain ($M_p = 13.8$ versus $M_a = 14.0$; $F(1, 103) = .13$, $p > .10$). However, on average, participants who lost Gamble 1 bet more than they had previously planned to in anticipation of such a loss ($M_p = 9.9$ versus $M_a = 12.6$; $F(1, 103) = 17.97$, $p < .001$). An analysis of the frequency of deviations showed similar results. Among those who deviated from the plan (n = 39; 37%), the outcome in Gamble 1 influenced participants' pattern of deviation in Gamble 2 ($\chi^2(1) = 10.59$, $p < .01$). Specifically, after a gain, the frequency of positive deviations (58%) did not differ from chance ($z = .70$, $p > .10$), whereas after a loss, there was unanimous (100%) preference for positive deviations ($z = 4.47$, $p < .001$).

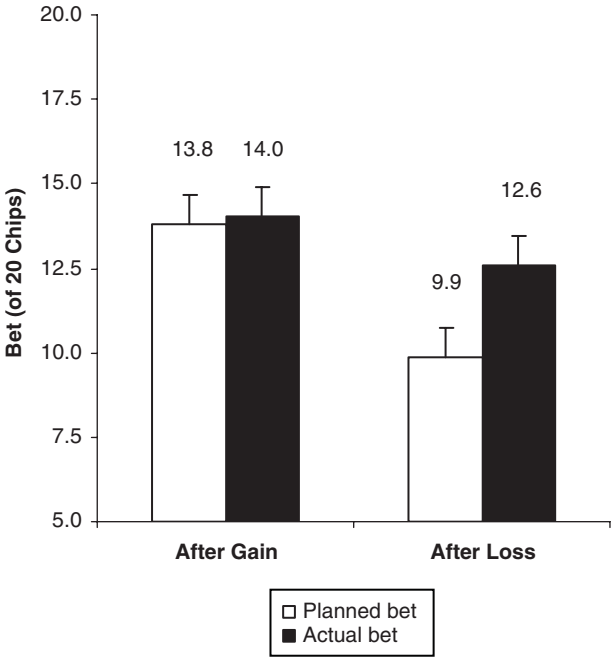
[4]We also conducted analyses of covariance (previous bet as a covariate) across all three experiments. The analyses produced virtually identical results in terms of interaction and pairwise comparisons. We decided to rely on the analyses of variance and actual means rather than on analyses of covariance and adjusted means.

Figure 1
EXPERIMENT 1: BETS AT THE PLANNING PHASE CONTIGENT ON ANTICIPATED OUTCOMES



Notes: Different superscripts indicate significance at .05, plan1 = planned bet at Gamble 1, plan2G = planned bet at Gamble 2 in anticipation of a gain in Gamble 1, and plan3LL = planned bet at Gamble 3 in anticipation of losses in Gambles 1 and 2.

Figure 2
EXPERIMENT 1: BETS AT THE PLANNING AND ACTUAL PHASES IN GAMBLE 2 AS A FUNCTION OF PREVIOUS OUTCOME



Actual phase: Gamble 3. We conducted a similar assessment for Gamble 3. An interaction emerged between the betting phase (planned versus actual) and the sequence of previous outcomes (gain–gain versus gain–loss versus loss–gain versus loss–loss) on betting patterns ($F(3, 101) = 3.26$, $p < .05$; see Figure 3). Pairwise comparisons showed no significant differences between planned and actual bets in Gamble 3 after a gain–gain ($M_p = 16.5$ versus $M_a = 15.4$; $F(1, 101) = 1.66$, $p > .10$), a loss–gain ($M_p = 12.4$ versus $M_a = 13.6$; $F(1, 101) = 1.87$, $p > .10$), and a gain–loss ($M_p = 11.3$ versus $M_a = 11.4$; $F(1, 101) = .002$, $p > .10$) sequence in the previous two gambles. However, after a loss–loss sequence, participants' actual bets increased relative to their planned bets in anticipation of such sequence of losses ($M_p = 11.4$ versus $M_a = 14.1$; $F(1, 101) = 8.42$, $p < .01$). Among those who deviated from the plan (37%, n = 39), the outcomes in Gambles 1 and 2 influenced participants' pattern of deviation in Gamble 3 ($\chi^2(3) = 8.82$, $p < .01$). Specifically, the frequency of positive deviations (80%) was greater than chance after a sequence of two losses (n = 10; z = 1.89, $p < .05$) but not after a loss–gain sequence (67%; z = 1.02, $p > .10$) or a gain–loss sequence (70%; z = 1.26, $p > .10$). After a sequence of gains, frequency of positive deviations was actually smaller than chance (20%; z = –1.89, $p < .05$).

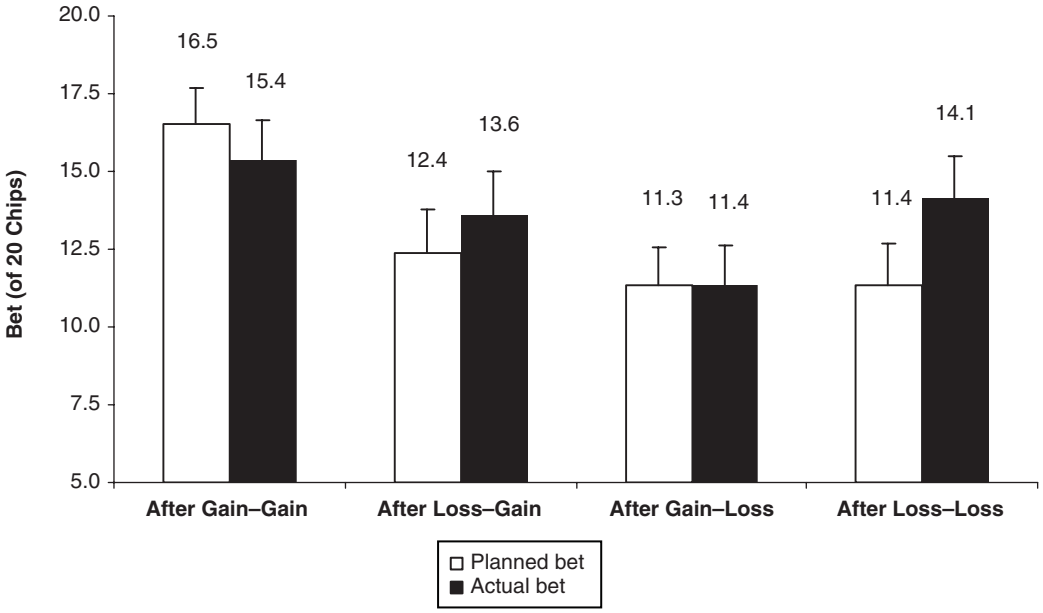
Discussion

Experiment 1 produced several initial findings. First, at the planning phase, participants chose to bet less after prior losses than after prior gains and a previous bet. This effect shows that people do not necessarily disregard the previous outcome when planning the next gamble but simply believe that losses will affect their behavior in a conservative manner; that is, they believe that they will spend less as their wealth declines. Second, asymmetric deviations from the plan emerged in Gamble 2 and in Gamble 3 when planned and actual bets are contrasted. For losses, on average, participants bet more than they had initially planned, whereas for gains, planned bets were carried over. Among those who deviated, positive deviations from the plan became the dominating option after losses, whereas both positive and negative deviations were as likely after gains.

These findings seem inconsistent with the gambler's fallacy argument, which would predict reversed deviations from the plan; that is, a previous loss should increase the likelihood and/or magnitude of positive deviations, and a previous gain should increase the frequency and/or magnitude of negative deviations. They are also at odds with Barkan and colleagues' (see Barkan and Busemeyer 1999, 2003; Barkan et al. 2005) theory and findings about isolation at planning and integration during the actual phase of the gamble. Our results show that during the planning phase, previous outcomes influenced subsequent choices. It is worth noting, however, that our procedure differed significantly from theirs. In their procedure, participants (1) were forced to take Gamble 1 and (2) needed to decide on taking or rejecting Gamble 2 (dichotomous variable). We use a more general procedure that allowed for the full possible range of bet choices on both gambles and had no restrictions on whether to take the initial gamble. Furthermore, participants were betting with their own participation fee in the experiment. In other words, as in most real gambling scenarios, participants were free to decide whether and how much they would want to bet their own money in both gambles. Finally, the flashing period (i.e., the 15-second time delay between bet and outcome) might have stimulated

Figure 3

EXPERIMENT 1: BETS AT THE PLANNING AND ACTUAL PHASES IN GAMBLE 3 AS A FUNCTION OF PREVIOUS SEQUENCE OF OUTCOMES



involvement and instigated stronger emotional reactions after the outcome was revealed.

The asymmetric deviations from the plan seem consistent with an emotion-based rationale. While planning what to do after a loss, people underestimate how much their state of mind will lead them to overreact and increase their bets after the negative emotions are eventually felt. Because there is no financial deprivation for gains, no specific pattern of behavior is observed.

This first experiment presents two caveats. First, there is no direct evidence to suggest that emotions are playing any role in the process. Showing evidence of asymmetric deviations does not provide direct evidence that people might be underestimating the impact of negative emotion on subsequent bets after losses. Second, Gamble 2 did not represent the terminal gamble. Therefore, it is possible that participants' willingness to bet more than planned after the first loss was because they knew that there would be further gambling opportunities in the near future (i.e., a third gamble). In other words, the presence of a third gamble made them more risk seeking in the second gamble. That a similar pattern of behavior also took place in Gamble 3 could be due to a consistency effect (e.g., "I bet more than planned in Gamble 2 after a loss, and I'll do the same in Gamble 3"). Experiments 2 and 3 address these issues.

EXPERIMENT 2

To test whether emotions attached to the losses might be influencing decisions in subsequent bets, participants in Experiment 2 are asked after the planning phase to predict how they will feel after losing and after winning the first bet. In line with an emotion-based rationale, we speculate that people might underestimate the intensity of emotions and/or its impact on future bets. Specifically, we test whether some people underestimate during the planning stage how bad they will feel after losing their first bet and, most important, whether those who deviate positively from the plan after the actual loss in Gamble 1 are more likely to have underestimated their negative emotions in the first place. This would provide initial direct evidence that emotions are an important aspect of the process. In addition, to assess the scope and robustness of the previous findings, we attempt to replicate the asymmetric deviations from the plan with a two-gamble scenario and a larger budget per gamble.

Method

Participants and design. One hundred four students from a West Coast university participated in this experiment. They were paid a $5 flat fee plus additional earnings contingent on the outcomes of the gambles. The experiment employed a 2 (Bet 2: planned versus actual; within) × 2 (Outcome 1: gain versus loss; between) mixed design.

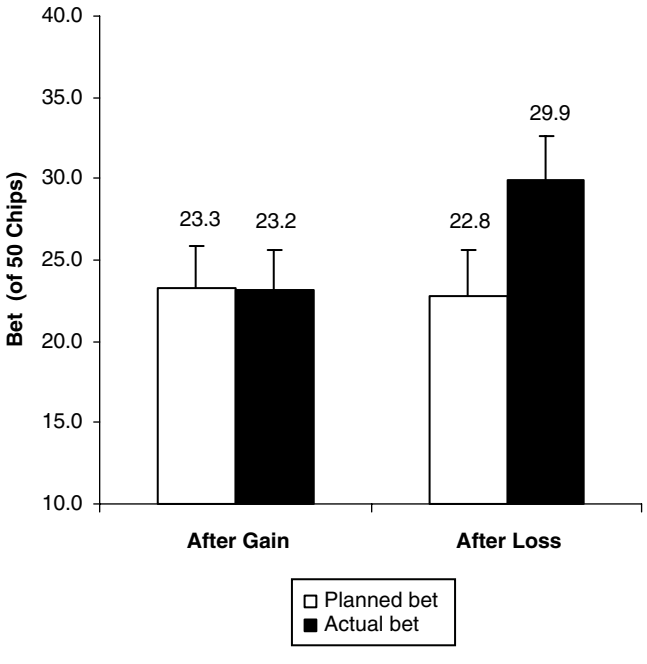
Procedure. The procedure was similar to that used in Experiment 1 with the following changes. First, there were only two gambles available, and participants were allowed to bet up to $5 (i.e., 50 chips) per gamble (i.e., they could bet up to $10 of their $15 participation fee). Second, to provide initial evidence for the role of negative emotions in deviations from the plan after losses, participants were asked in the planning phase to estimate on a continuous 101-point scale how they would be feeling after winning and after losing whatever they decided to bet in Gamble 1 ("After winning [losing] $X, I will feel ___"; 0 = "very bad," 50 = "neutral," and 100 = "very good" [any number from 0 to 100 is allowed]). This estimation would be contrasted with the actual emotional state to be reported on the same scale just after the outcome in Gamble 1 ("Right now, I feel ___"; 0 = "very bad," 50 = "neutral," and 100 = "very good" [any number from 0 to 100 is allowed]).

Results

Planning phase. The results showed that prior outcomes influenced subsequent planned bets ($F(1, 102) = 5.16$, $p < .01$). Compared with their planned bets in Gamble 1 ($M = 25.0$), participants chose lower planned bets in Gamble 2 after an anticipated loss ($M_L = 21.3$) in the previous gamble ($F(1, 103) = 10.28$, $p < .01$), but they reported similar planned bets in Gamble 2 after an anticipated gain ($M_G = 24.4$) in the previous gamble ($F(1, 103) = .20$, $p > .10$). Moreover, planned bets in Gamble 2 were slightly lower in anticipation of a loss (versus gain) in Gamble 1 ($F(1, 103) = 3.13$, $p < .10$).

Actual phase. Again, there was no significant difference between the planned ($M = 25.0$) and the actual ($M = 25.6$) bet in Gamble 1 ($F(1, 103) = .93$, $p > .10$). In Gamble 2, however, a significant interaction emerged between the betting phase (planned versus actual) and the outcome of Gamble 1 ($F(1, 102) = 8.40$, $p = .005$; see Figure 4). For gains, there was no significant deviation from the plan ($M_p = 23.3$ versus $M_a = 23.2$; $F(1, 102) = .01$, $p > .10$). However, there was a significant deviation from the plan for losses. On average, participants who lost Gamble 1 bet more than they had previously planned to bet in anticipa-

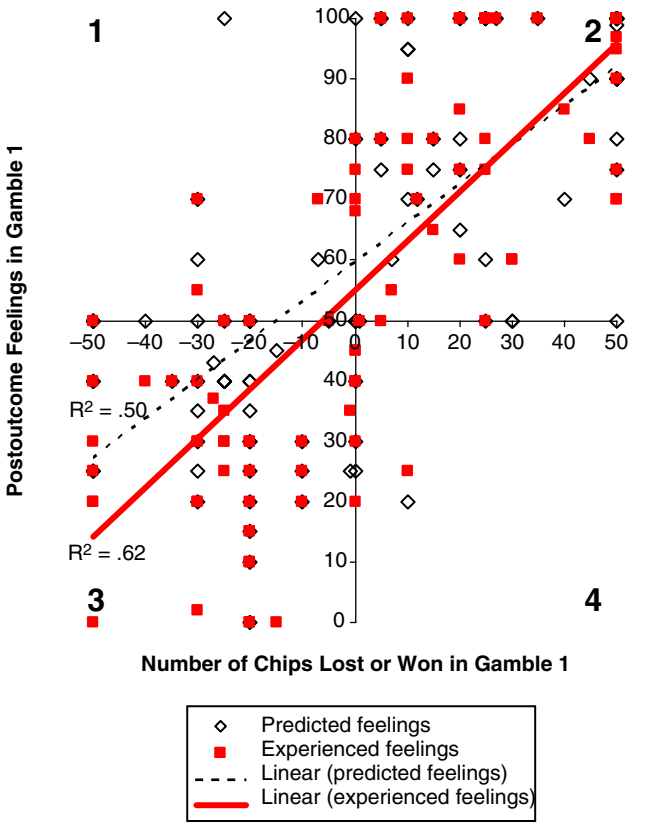
Figure 4
EXPERIMENT 2: BETS AT THE PLANNING AND ACTUAL PHASES IN GAMBLE 2 AS A FUNCTION OF PREVIOUS OUTCOME



tion of such loss (M_p = 22.8 versus M_a = 29.9; F(1, 102) = 14.82, $p < .001$). Of the participants, 39% (n = 41) deviated from the plan. Within this group, the pattern of deviations in Gamble 2 was contingent on the outcome of Gamble 1 ($\chi^2(1) = 5.60$, $p < .05$). After a gain, preference for positive (52.6%) relative to negative deviations did not differ from chance (z = .22, $p > .10$), whereas most of the deviations were positive (86.4%) after a loss. Only three participants decided to bet less than they had originally planned to bet after a loss (z = 3.41, $p < .001$).

(Mis)estimation of emotions. The results showed an interaction between predicted and experienced emotional state and type of outcome (F(1, 102) = 5.25, $p < .05$). On average, there was no significant difference between predicted and actual emotions for gains (M_{pred} = 79.9 versus M_{exp} = 78.8; F(1, 102) = .29, $p > .10$). However, participants experienced stronger negative emotions after a loss than they had anticipated in the planning stage (M_{pred} = 39.1 versus M_{exp} = 31.1; F(1, 102) = 12.84, $p = .001$). Figure 5 plots the predicted and experienced emotions (y-axis) as a function of number of chips won or lost per participant (x-axis). The gap between the predicted and the experienced trend lines in Quadrant 4 shows that participants underestimated how bad they would feel after losing a given bet. On the gain side (Quadrant 2), however, there was virtually no gap between predicted and experienced trend lines.

Figure 5
EXPERIMENT 2: PREDICTED AND EXPERIENCED POSTOUTUCOME FEELING AFTER GAMBLE 1



(Mis)estimation of emotions and deviations from the plan. To assess a potential relationship between affective (mis)estimations and subsequent deviations from the plan, we conducted chi-square analyses to test whether the type of deviation from the plan in Gamble 2 was contingent on the type of (mis)estimation of postoutcome emotions in Gamble 1. We hypothesized that participants who surprisingly felt worse than expected after a loss might be more likely to change their plans (i.e., whether to deviate), though there should be no association for gains. The results confirmed our predictions. After gains, deviations from the plan were not contingent on (mis)estimations of postoutcome emotions ($\chi^2(2) = 1.51$ $p > .10$). However, deviations were significantly dependent on the (mis)estimations of postoutcome emotions after losses ($\chi^2(2) = 11.81$, $p < .01$). Among those who deviated positively from the plan (the most common pattern of deviation after losses), 68.4% had underestimated their negative feelings as a result of a loss in Gamble 1, whereas only 21.5% overestimated it. The remaining 10.5% had been accurate about the intensity of their emotions. A regression analysis showed no correlation between the magnitude of underestimation of negative emotion and the magnitude of positive deviations from the plan after a loss ($R^2 = .03$; $\beta = -.03$, $p > .10$). In other words, underestimation of negative emotions correlated with whether participants deviated positively from the plan but had no impact on how much they deviated.

Discussion

Experiment 2 provides two additional contributions. First, it replicates the results of Experiment 1 with a two-gamble scenario and a larger budget per bet. The asymmetric deviations from the plan still remained in a scenario in which participants faced only two gambles and were allowed to bet a larger portion of their own participation fee. Second, Experiment 2 offers initial evidence that emotions may be playing a role in the process. After losses, participants tended to feel worse than they expected, whereas no systematic bias was evident after gains. Most important, there was a significant association between the type of misestimation and the type of deviation. Those who felt worse than expected after a loss in Gamble 1 were more likely to bet more than planned in Gamble 2. After gains, the type of deviation was not contingent on the type of misestimation.

The main caveat of this experiment is that the inferences about the impact of emotions on deviations from the plan after losses are based on correlational data. Experiment 3 addresses this issue.

EXPERIMENT 3

In Experiment 3, participants' emotions are orthogonally altered between gambles. Because we want to further investigate the underlying reasons for deviations from the plan, because we observe these deviations only after losses, and because the gain condition does not serve as a control for the loss condition, Experiment 3 focuses only on the loss condition. Most important, after the loss in Gamble 1 but before the betting decision in Gamble 2, we inserted a 5½-minute delay manipulation. This time delay was filled with a video clip meant to trigger different affective states (i.e., negative versus neutral versus positive). We hypothesize that the affective state induced by the video will moderate the extent to which participants deviate from the plan after

losses. Specifically, we expect that when we hold losses constant across treatments, participants in the negative video condition will bet more than planned after a loss because negative emotions should remain present at the time of the betting decision in Gamble 2. In contrast, this deviation should be mitigated for those in the positive video condition because positive emotions should replace the negativity generated by the monetary loss. In the neutral video conditions, the predictions are a function of how effective the neutral video is at ameliorating participants' emotions. If the neutral video delay (i.e., a documentary) significantly attenuates the negative emotions, deviations from the plan should be mitigated, similar to the positive video condition. However, if negative emotions linger despite the neutral video delay, positive deviations should still emerge, similar to the negative video condition.

Method

Participants and design. One hundred three students from a West Coast university participated in this experiment. They were paid a $5 flat fee plus additional earnings contingent on the outcomes of the gambles. The experiment employed a 2 (Bet 2: planned versus actual; within) × 3 (type of delay: negative video versus neutral video versus positive video; between) mixed design.

Procedure. The procedure was similar to the one used in Experiment 2, except that there was a delay manipulation between the gambles and all participants lost Gamble 1 and won Gamble 2. Before the planning phase, participants were told that as a technical matter, the experimenter would need to double-check after Gamble 1 whether the program was properly recording the data. Therefore, there would be a time delay between the gambles. They were also told that further information would be provided subsequently. Then, participants planned their bets and played Gamble 1. After losing whatever they bet in Gamble 1, all participants were instructed to watch a video clip (negative versus neutral versus positive) while the experimenter double-checked the program (the experimenter pretended he was performing this task from the main computer). In the negative, neutral, and positive video conditions, participants watched a 5½-minute clip of the drama *Life as a House*, a documentary about Africa, and a *Friends* episode, respectively (for similar manipulations, see Andrade 2005; Cohen and Andrade 2004). Note that we chose the negative video, *Life as a House*, because of the potential similarities of emotions it triggers relative to those associated with a monetary loss in gambling environments (i.e., disappointment, frustration, and anger; see Andrade and Ariely 2009). Other negative emotional states, which have been associated with risk-averse behavior (e.g., fear), may well produce different results (see Lerner and Keltner 2001).

Participants were asked to indicate their current emotional state before Gamble 1 (i.e., at the beginning of the experiment). We used a continuous 21-point scale in this experiment ("Right now, I feel ___"; –10 = "very bad," 0 = "neutral," and +10 = "very good"). After playing Gamble 1, experiencing the loss, and then watching a 5½-minute video clip, participants were instructed to indicate their opinion about the video, which, they were told, would help the experimenter identify an "optimal filler task" to be used in future experiments. At this time, participants again reported their current emotions. Then, Gamble 2 started on a subsequent screen. Participants were reminded of their planned bet in case of a loss and were asked to revise or confirm it. Everything else was similar to the previous experiments. Our exit protocols indicated that no participant guessed the main purpose of the time delay and/or the video clip.

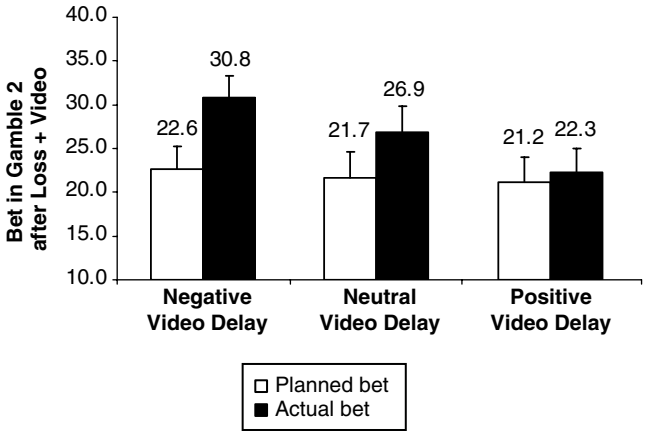
Results

Planning phase. Similar to Experiments 1 and 2, the results showed that preceding outcomes influenced subsequent planned bets ($F(2, 101) = 7.9$, $p = .001$). Compared with their planned bets in Gamble 1 (M = 27.1), participants reported lower planned bets in Gamble 2 after an anticipated loss in the previous gamble (M = 21.9; $F(1, 102) = 14.54$, $p < .001$), but they reported similar planned bets in Gamble 2 after an anticipated gain in the previous gamble (M = 25.0; $F(1, 102) = 2.19$, $p > .10$). Planned bets in Gamble 2 in anticipation of a loss (versus gain) in Gamble 1 did not differ from each other ($F(1, 102) = 2.6$, $p = .11$).

Emotional state after Gamble 1. On average, participants across all three conditions lost the same amount of money in Gamble 1 ($F(2, 100) = 1.54$, $p > .10$). That is, the three conditions were comparable. Nonetheless, there was a significant interaction ($F(2, 100) = 9.3$, $p < .001$) between participants' reported emotions (before Gamble 1 versus after the loss + video) and the type of delay manipulation (negative versus neutral versus positive video). Pairwise comparisons show that compared with their reported emotional state before the gambles (i.e., at the beginning of the experiment), participants felt significantly worse after experiencing a loss followed by a negative video ($M_{before} = 1.0$ versus $M_{after} = –2.72$; $F(1, 100) = 17.4$, $p < .001$) and after experiencing a loss followed by a neutral video ($M_{before} = 1.6$ versus $M_{after} = –.57$; $F(1, 100) = 4.4$, $p < .05$). The effects were reversed when the loss was followed by a positive video. Despite the financial loss, the video actually made participants feel slightly better relative to their reported emotions before the gambles ($M_{before} = 1.5$ versus $M_{after} = 3.3$; $F(1, 100) = 3.5$, $p = .06$). In summary, the results show that the negative emotional state generated by the loss tends to linger for a little while (i.e., 5½ minutes) unless a positive event, such as a funny sitcom, takes place in between the gambles. Finally, a comparison across conditions shows that the participants' reported emotional state right before Gamble 2 (i.e., after the loss + video) varied significantly as a result of the video ($F(2, 100) = 17.6$, $p < .001$). Those in the positive video condition felt significantly better (M = 3.3) than those in the neutral video condition (M = –.57; $F(1, 62) = 13.05$, $p = .001$), whereas those in the negative video condition felt significantly worse than those in the neutral video condition (M = –2.72; $F(1, 67) = 4.37$, $p < .05$).

Actual phase. As we expected, there was no difference between the planned (M = 27.2) and the actual (M = 27.8.6) bet in Gamble 1 ($F(1, 102) = 2.6$, $p > .10$). Moreover, the predicted bets in Gamble 2 in anticipation of a loss were the same across type of delay condition ($F(2, 100) = .07$, $p > .10$). Finally, as we already pointed out, on average, participants across all three conditions lost the same amount of money in Gamble 1. Within this context, a significant interaction emerged between the betting phase (planned versus actual) and the type of delay after the loss in Gamble 1 ($F(2, 100) = 5.65$, $p = .005$; see Figure 6). On

Figure 6
EXPERIMENT 3: BETS AFTER LOSSES AT THE PLANNING AND ACTUAL PHASES IN GAMBLE 2 AS A FUNCTION OF TYPE OF DELAY



average, participants whose negative emotions lingered as a result of the negative video or despite the neutral video bet more than planned after a loss in Gamble 1 (neutral video: $M_p = 21.7$ versus $M_a = 26.9$; $F(1, 100) = 9.9$, $p < .01$; negative video: $M_p = 22.6$ versus $M_a = 30.8$; $F(1, 100) = 32.4$, $p < .001$). However, on average, those who lost Gamble 1 but whose negative emotions had been converted into pleasant ones by the positive video bet the same amount they planned to bet in anticipation of such loss ($M_p = 21.2$ versus $M_a = 22.3$; $F(1, 100) = .52$, $p < .10$). A linear decrease in the magnitude of deviations emerged from negative, to neutral, to positive video conditions ($F(1, 100) = 11.23$, $p = .001$). Finally, a multiple regression showed that the participants' reported emotions right before the betting decision in Gamble 2 significantly affected their willingness to deviate from the plan after a loss ($\beta = -.74$, $t(100) = -4.19$, $p < .001$), whereas the amount lost in Gamble 1 had no influence ($\beta = .03$, $t(100) = .45$, $p > .10$; $R^2 = .16$; $F(2, 100) = 9.64$, $p < .001$). In short, independent of the amount lost, stronger negative feelings before Bet 2 led to larger positive deviations from the plan.

An analysis of the frequency of deviations confirmed the previous patterns of results. Of the participants, 45% (n = 47) deviated from the plan. Within this group, deviations in Gamble 2 were contingent on the outcome of Gamble 1 ($\chi^2(1) = 6.24$, $p < .05$). In the positive video condition, only 11 participants deviated from the plan, and the number of positive deviations (72%) did not differ from chance ($z = 1.45$, $p > .10$). In the neutral condition, 14 participants deviated from the plan, and the number of positive deviations differed significantly from chance (78%; $z = 2.09$, $p < .05$). The effect was further amplified in the negative video condition, in which 22 participants deviated from the plan, all of whom chose to bet more than planned (100%; $z = 4.69$, $p < .001$).

Discussion

This final experiment provides direct evidence of the importance of negative emotions on positive deviations from the plan in sequential gambles. Moreover, it demonstrates the robustness of this effect. The negativity generated by a loss in Gamble 1 lingered. The introduction of a short time delay with a neutral video after a loss was insufficient to wash away the negative emotions, let alone replace them with pleasant feelings. Consequently, positive deviations from the plan occurred not only in the negative but also in the neutral video conditions. For the negative emotions after a loss to be eliminated, a clearly enjoyable experience in between was needed. When the loss was followed by the positive video, negativity gave way to positive emotions, which in turn eliminated participants' tendency to "overreact." These findings provide a justification for why Harrah's "luck ambassadors" offer the unlucky customer a pleasant break (e.g., free dinner) in an attempt to convince him or her to stop gambling in the short run. Without a meaningful pleasant substitute, the luck ambassador's strategy may not be persuasive enough.

We must highlight three further issues. First, the amount lost in Gamble 1 and the planned bets in Gamble 2 in the case of a previous loss were the same across all three conditions. Thus, differences across conditions cannot be attributed to different previous experiences. Second, all participants were reminded of their planned bet before their betting decision in Gamble 2. Thus, the results cannot be attributed to a potential interaction between type of delay and recall of a previous plan. Third, the presence of the three different conditions rules out the hypothesis that any video could eliminate the positive deviations from the plan. At least within this paradigm, a filler task capable of replacing negative with positive emotions is necessary for participants to keep their original plan.

GENERAL DISCUSSION

Real-life gambling involves situations in which consumers may plan the budget with which they want to gamble. Yet it is common to encounter cases of consumers who lose and then end up betting more than planned in the "heat of the moment" in an attempt to make up for their losses. In this article, we investigate how consumers might deviate from their planned behavior during the actual gambling process in a sequential gambling environment. To control for the impact of learning, we provided participants with a scenario in which (1) there was full information about the characteristics of the gambles before the planning phase, (2) the period between the planning and the actual phases of the gambles was short, (3) they believed that their plans would be executed, and (4) a reminder of the planned bet showed up right before they made their actual bet. To make the experience similar to an actual casino, participants experienced a time delay between bets and outcomes (i.e., an "X" sign flashing on the board for 15 seconds), bet their own participation fees, and were free to decide whether and how much (within a certain range) they would bet in any of the gambles.

Three main findings emerge across the experiments. First, in the planning phase, people behave conservatively, betting less after an anticipated loss and the same amount after an anticipated gain. Second, when participants were offered the unexpected choice to change their bet during the actual phase, we find a remarkably systematic and robust pattern of deviation from the plan. After a loss in Gamble 1, participants bet significantly more in Gamble 2 than they

initially planned, while after a gain in Gamble 1, on average, we observed no differences from plans in Gamble 2. Indeed, the frequency of deviations shows that across all three experiments, an impressive majority (i.e., approximately 90% of those who deviated from the plan in Gamble 2) preferred positive to negative deviations in Gamble 2 after experiencing a loss in Gamble 1. In contrast, after a gain, preference for positive versus negative deviations did not differ from chance. In short, asymmetric deviations from the plan emerge in a sequential and fair gambling scenario. Third, we propose that people might be underestimating during the planning stage (before the outcome is experienced) how much their actual negative emotions will influence subsequent decisions. Consistent with this proposal, we show that positive deviations in Gamble 2 occurred more frequently among those who, during the planning stage, underestimated the intensity of negative emotions after a loss in Gamble 1 (Experiment 2). Moreover, changes in people's emotional state between gambles play a meaningful role. Deviations from the plan after losses went away when a pleasant delay was placed between gambles (Experiment 3).

IMPLICATIONS AND FURTHER RESEARCH

Consumer spending in commercial casinos alone increased from $17.10 billion in 1996 to $32.42 billion in 2006. How much of this amount represents deviations from the plan is far from clear. However, if our results can at least in part be extrapolated, it seems that a significant proportion of consumer spending in casinos may actually represent unplanned (or even uncontrolled) behavior. To the extent that the unplanned expenditures might capture a significant chunk of discretionary income, our research also raises public policy questions about the potential negative impact of gaming even among nonpathological gamblers (i.e., the vast majority of consumers).

This research also relates to some of the emerging trends in the marketing of state-owned lotteries, which raised more than $56 billion and returned more than $17 billion to state governments in 2006. Many state lotteries are contemplating introducing new games, such as scratch-off games, which have a sequential nature and promise instant gratification. These games have the feature that consumers can repeatedly buy and scratch tickets in the hope of winning. A concern is that these games may induce consumer overspending (particularly among economically disadvantaged consumer; Schwartz 2007). Our finding that losses might induce unexpected overbetting is relevant for the welfare-maximizing design of these types of lotteries.

Some research problems also remain to be investigated. For example, the nature of deviations from the plan depends on the characteristics of the gamble. In particular, for the same expected value, the gamble could involve larger gains but smaller odds of winning the gamble. How would such a gamble affect deviations from planned behavior? In addition, although in sequential gambles people tend to become more risk seeking after losses (e.g., Gehring and Willoughby 2002), there is evidence of the opposite effect, at least when gambles are framed in terms of investments (e.g., Shiv et al. 2005). Therefore, a worthwhile research question is, What motivates people to chase versus walk away? For example, among people who underestimate the intensity of their negative emotions, under certain circumstances, they may interpret the experienced negative emotion as a stop signal. The direction of the effect may be a function of the interplay between affective evaluation (i.e., stop gambling) and affect regulation (i.e., chase to get rid of the aversive state) (Andrade 2005; Andrade and Cohen 2007). The reason that affect regulation would be the dominating mechanism in the current case may be due to the perceived mood-lifting opportunities associated with the gambling environment in question. Betting more than planned is often a simple, readily available, easy-to-rationalize, and effortless action, which might eliminate negative emotions, especially if people expect to at least break even (Thaler and Johnson 1990). This is the case in our scenarios, in which people are presented with a sequence of fair sequential gambles. Changes to the properties of the gambles might lead to different results.

It is also worthwhile to connect our findings to the literature on affective forecasting, which has shown that people overestimate the duration and/or intensity of their emotional reactions to a given event. This impact bias has been demonstrated in multiple contexts (Wilson and Gilbert 2003), including gambling (Kermer et al. 2006). The results of Experiment 2 show that the opposite may hold true. In a within-subjects design, participants underestimated the impact of a loss on their postoutcome emotions (i.e., they felt worse than they expected). Two aspects of our procedure were unique. First, there were 15 seconds of flashing between bet and outcome. This waiting period might have built up arousal and unexpectedly made the postoutcome emotions more intense than people had initially anticipated. Second, unlike in Kermer and colleagues' (2006) work, participants in our experiment deliberately chose to bet, and (some) eventually lost part of their own participation fee, which makes any rationalization of their actions more difficult. In short, it is possible that if people disregard potential sources of arousal/emotion (e.g., the exciting/anxious waiting period) and also have a difficult time providing *ex post* justification for their choices, underestimation of affect might take place. Further research is needed to address these speculations.

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