The Impact of Perceived Control on the Imagination of Better and Worse Possible Worlds

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The Impact of Perceived Control on the Imagination of Better and Worse Possible Worlds

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Effects of perceived control and close alternative outcomes on counterfactual generation were examined. Subjects played a computer-simulated "wheel of fortune" game along with another player (a confederate) in which two wheels spun simultaneously. Subjects had either control over spinning the wheel or control over which wheel would determine their outcome and which would determine the other player's outcome. Subjects experienced either a "near big win," with a loss by the other player, or a "near loss," with a big win by the other player. Results showed that (a) subjects generated counterfactuals about the aspect of the game they controlled, (b) the direction of these counterfactuals corresponded to the close outcome associated with the aspect they controlled, and (c) these counterfactuals predicted affective responses to the outcome of the spin. Cognitive and motivational implications of the influence of perceived control on counterfactual generation are discussed.

Many life experiences prompt reflection on the events that preceded them. After a car accident, one might ponder, "If only I had been driving more slowly, I could have avoided hitting the other car." On the other hand, one might think, "At least I put my seat belt on before I left; I could have been killed." This reflection on "what could have been" is termed *counterfactual thinking* (Kahneman & Tversky, 1982).

As seen in the example above, the same event can often elicit very different counterfactuals. What determines the alternative worlds that are imagined? What makes one feature of an event more mutable than another? Recent research has identified some of the cognitive "rules of mutability." For instance, people are generally more likely to imagine what might have been different about the exceptional (i.e., surprising or unexpected) aspects of a given event than about the normal aspects of the same event (Kahneman & Miller, 1986; Kahneman & Tversky, 1982). In a similar vein, the actions people take in a situation are more readily mutated than the actions people do not take (Kahneman & Miller, 1986; Landman, 1987).

The present research investigates the role that controllability plays in determining the mutability of the features of an event and thus the nature of counterfactual generation. The impact of perceived control on social judgments is both pervasive and well documented. For example, feelings of control can lead to stronger attributions of responsibility (Brickman et al., 1982), better coping skills (Taylor, Lichtman, & Wood, 1984), and more confidence (Langer, 1975). The goal of the present research is to show that people are more likely to generate counterfactuals about aspects of events over which they feel they have control. This prediction is derived, in part, from work by Kahneman and Miller (1986), who have suggested that focusing attention on particular actions enhances the availability of counter-

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factual alternatives to these actions, and also from work that has demonstrated a general tendency to focus attention on the self (e.g., Bond, 1985; Brenner, 1973). We propose that people tend to focus attention on things that they control and, in turn, this focus of attention determines the counterfactuals that are made.

In addition, the focus of attention on one or another event within a given situation may determine whether a better or worse alternative to reality is imagined (Markman, Gavanski, Sherman, & McMullen, 1993). Some situational events will bring to mind a better possible world, whereas other events will bring to mind a worse possible world. This is important because, as previous research (Johnson, 1986; Markman et al., 1993; Roese, 1994) has demonstrated, the direction of the counterfactual can have affective and motivational consequences for the individual: Upward (improvement on reality) counterfactuals prepare us for the future, at the expense of feeling worse, whereas downward (worsening of reality) counterfactuals help us feel better, at the expense of leaving us less prepared for the future.

Kahneman and Miller (1986) attempted to demonstrate a general tendency to imagine better outcomes more often than worse outcomes by examining subjects' responses to a simple scenario they had created. We altered their scenario slightly and gave the following version to 27 Indiana University undergraduates:

> Tom and Jim both were eliminated from a tennis tournament, both on a tie-breaker. Tom lost when his opponent served an ace. Jim lost on his own unforced error. Who will feel worse about the match that night?[1]
>
> *Responses*: Tom 0%, Jim 100%

Kahneman and Miller's explanation for this finding is that "the outcome of a contest is more commonly undone by improving the losing performance . . . than by imagining a poorer performance of the winning team" (p. 143). This suggests that it is somehow cognitively easier to generate upward counterfactuals than downward counterfactuals. We believe, however, that an equally compelling explanation is that Jim was more in control of his own outcome than Tom. Thus, it is possible that subjects generated more counterfactuals about Jim than about Tom because Jim was more in control of his own situation.

Support for this explanation is supplied by the responses of another 27 Indiana University undergraduates to a scenario we created in which Tom and Jim *won* a tennis match under different conditions of personal control.

> Tom and Jim both won the semi-final matches of a tennis tournament, both on a tie-breaker. Tom's winning shot hit the white line, just barely staying in. Jim won when his opponent's shot hit the top of the net and just barely bounced back over to his opponent's side. Who will feel better about the match that night?
>
> *Responses*: Tom 78%, Jim 22%

Subjects once again judged greater affect for the player who had control over the outcome (i.e., Tom, who barely hit the line). This enhanced affect suggests that it was easier for subjects to generate downward counterfactuals for Tom's shot that barely stayed in. This finding runs counter to Kahneman and Miller's original explanation in that the good outcome of this contest was undone more easily by imagining a poorer performance by the winner than by imagining a better performance by the loser. However, as in the previous demonstration, the more mutable action was the one under the control of the protagonist of the story. This suggests that controllability may influence the ease of imagining different outcomes, and the specific counterfactual generated determines the affect people feel in a given situation.

Controllable actions by the self may be especially mutable. It should be easier to imagine oneself having made a different behavioral decision than to imagine an alternative in the behavior of another person or a change in a situational factor. This is in part due to the tendency of people to attend closely to their own actions (Bond, 1985) and in part due to the fact that when people make a conscious choice (e.g., which tennis shot to try, which job to take), they often consider alternative actions prior to the actual decision. The alternative courses of action would then be highly accessible to serve as counterfactuals. The prechoice musings of others are not usually available.

A recent article by Girotto, Legrenzi, and Rizzo (1991) presents some preliminary evidence indicating that controllable actions are more mutable than noncontrollable actions. These researchers presented a scenario (causal sequence) to subjects describing how the protagonist arrived home unusually late to find his wife dead of a heart attack and then asked subjects to list ways the events in the story could be changed so that the outcome would be different. The scenario contained four events that "could have" delayed the protagonist: (a) the maneuvers of a truck, (b) a passing flock of sheep, (c) a tree trunk in the road, and (d) the protagonist's decision to drink a beer in a bar. Several versions of the scenario were used that had different orderings of the events. In all cases, Girotto et al. found that subjects were most likely to mutate the protagonist's decision to drink a beer.

In the Girotto et al. scenario, however, the controllability of the specific action itself was not manipulated. A better test of the controllability notion would be to create a situation in which a particular event is controllable and contrast it with an equivalent situation where the same event is present but is not controllable.

In addition, in the Girotto et al. scenario, a bad outcome was paired with only a better counterfactual *default* event. However, most outcomes that we experience in our daily lives allow imagination of both better *and* worse possible alternatives (Markman et al., 1993). The present research seeks to extend Girotto et al. by implicating the role of control in a situation where both alternatives are available; this should enable us to determine how controllability influences the direction as well as the likelihood of counterfactual generation.

In investigating the role of controllability in direction of counterfactual generation, Roese and Olson (this issue) found that subjects made upward counterfactuals when a story character's actions were controllable but made downward counterfactuals when those actions were uncontrollable. In contrast to their study, the present work will put subjects in a situation that has both controllable and uncontrollable features and investigate the mutability of controllable versus uncontrollable features. In our study, the direction of the counterfactual should be determined not simply by the fact that an event is controllable but, rather, by the feature of the specific event that is controllable; whatever alternative to reality is afforded by mutating this controllable feature (i.e., either a better *or* a worse possible world) should be generated.

Finally, the present study examines the effect of perceived control on the relationship between counterfactuals and affect. Thus, the research investigates not only the mutability of the features in a scenario but also the impact of mutability on feelings of satisfaction and regret.

OVERVIEW OF THE RESEARCH

The goal of the present research is to examine how controllability affects the generation of counterfactuals. Subjects played a computer-simulated "wheel of fortune" game. They saw on the screen two wheels that spun simultaneously. Subjects were told that the outcome of one of the wheels would determine how many lottery tickets they would win, and the outcome of the other wheel would determine the number of lottery tickets won by the other subject who was present (actually a confederate). The game was fixed to result in one of the two following wheel outcomes: (a) The subject's wheel narrowly missed hitting a jackpot of 75 lottery tickets and instead landed on 10 tickets, whereas the other player's wheel landed on Bankrupt (i.e., the *own (could have been) better/other (was) worse* outcome). (b) The subject's wheel narrowly missed landing on Bankrupt and instead landed on 10 tickets, whereas the other wheel landed on 75 tickets (i.e., the *own (could have been) worse/other (was) better* outcome). The subject's wheel was set to narrowly miss a certain outcome in order to elicit what have been termed *close counterfactuals* (Kahneman & Varey, 1990) of the form "I *almost* won 75 tickets" or "I *almost* went bankrupt."

Thus, although all subjects won 10 lottery tickets, they were able to make either "within-wheel" counterfactuals (focusing on what could have happened on their own wheel) or "between-wheel" counterfactuals (focusing on what could have happened had the other wheel determined their outcome). Hereafter, whether a counterfactual was within or between wheel will be referred to as the *focus* of the counterfactual. Further, although all subjects won 10 tickets, they were able to make either upward counterfactuals (e.g., "I could have won 75 tickets") or downward counterfactuals (e.g., "I could have gone bankrupt"). Hereafter, whether a counterfactual was upward or downward will be referred to as the *direction* of the counterfactual.

Control was manipulated by giving some subjects a choice of where their own determining wheel should start and how fast it should spin (the *spin-choice* condition), whereas other subjects chose which wheel would be the determining wheel for them (the *wheel-choice* condition) and which would determine the outcome of the other player.

The main prediction is that subjects would tend to focus on, and therefore make counterfactuals about, whichever aspect of the game they controlled. That is, spin choosers should generate more within-wheel counterfactuals (e.g., "Had I started the wheel at a different point . . .") than wheel choosers. Wheel choosers should generate more between-wheel counterfactuals (e.g., "Had I played on the other wheel . . .") than spin choosers. This result would be demonstrated by a main effect of type of control on the focus of counterfactual generation, the relative generation of within- and between-wheel counterfactuals.[2]

Second, the type of control exerted (spin choice or wheel choice) should interact with the outcome condition to produce the following effects for direction of the counterfactual: Subjects whose own wheel almost hit 75 should generate a greater proportion of upward counterfactuals (e.g., "I could have won 75 tickets . . .") if they were spin choosers than if they were wheel choosers. Subjects whose own wheel almost hit Bankrupt should generate a greater proportion of downward counterfactuals (e.g., "I could have gone bankrupt . . .") if they were spin choosers than if they were wheel choosers.

Finally, the direction of counterfactuals generated by subjects should predict their satisfaction with the outcome. Therefore, subjects whose own wheel almost hit 75 should be less satisfied if they were spin choosers than if they were wheel choosers. In contrast, subjects whose own wheel almost hit Bankrupt should be *more* satisfied if they were spin choosers than if they were wheel

choosers. This relation between counterfactuals and satisfaction would be consistent with previous research (Johnson, 1986; Markman et al., 1993) showing that upward counterfactuals, which improve on reality, engender dissatisfaction whereas downward counterfactuals, which worsen reality, engender satisfaction.

METHOD

Subjects and Design

Sixty-one introductory psychology students at Indiana University participated in partial fulfillment of a course requirement. Subjects were randomly assigned to conditions of a 2 (Wheel Outcome: own better/other worse vs. own worse/other better) × 2 (Control Type: spin choice vs. wheel choice) factorial design.

Procedure

On entering the laboratory, subjects were told that the study concerned "game-playing and the decisions people make when they play games." Both the subject and a female confederate were seated in front of a Macintosh IICI computer that depicted two identical "wheels of fortune." Each wheel was divided into eight sections, labeled in the following manner: two $5 sections, two $10 sections, two $15 sections, one $75 section, and one section labeled Bankrupt.[3] The experimenter then explained the operation of the lottery:

> The numbers on the wheel correspond to the number of lottery tickets you will win if the wheel lands on that number. Here are five lottery tickets to start off with [both the subject and the confederate were given five lottery tickets]. If the wheel lands on Bankrupt, you will lose these five tickets. The lottery is for a $75 cash prize that one subject will win when the entire experiment has been run. So, the more tickets you win, the better your chance of winning $75! You have a good chance of winning because there are only 60 subjects in the study. After spinning once, you will be given further instructions.

To account for the presence of two wheels on the computer screen, the experimenter gave the following explanation:

> There are two wheels on the screen because, as you can see, there are two subjects in the study. One of you will be Person 1 and the other will be Person 2. Each of you will have your own wheel. The computer is set up so that it spins both wheels at the same time. Both of you will win the number of lottery tickets indicated on your own respective wheels when they come to a stop. Person 1 will remain in this room, but Person 2 will move next door, where there is another computer. Both computers are hooked up so that they both show the same thing on the screen at the same time. Person 1 will be the one starting the wheel in this room. Person 2 will be able to see what is happening on the screen while sitting in the other room.

Ostensibly, subjects were then "randomly assigned" to be Person 1 or 2 by drawing slips of paper. However, the drawing was rigged to ensure that the subject was always Person 1.[4] When the confederate drew "Person 2," she was taken to the room next door.

Spin-choice condition. The experimenter returned and explained that Person 1 (subject) always had control over the speed and starting point of the spin. The experimenter demonstrated how to move the wheel in a clockwise or counterclockwise fashion to determine the starting location of the pointer on the wheel.[5] The subject was then allowed to adjust the starting point of the wheel. Subjects were also allowed to choose a spinning speed for the wheel by clicking on one of two buttons labeled *fast speed* and *slow speed.* In reality, the wheels always spun at the same moderate speed. The subject was then instructed to click on a button labeled *demo spin,* which set both wheels in motion. The demonstration was rigged so that both wheels would stop on $5, each wheel on a different $5 section.

After the demonstration, the experimenter announced that they would be going on to the "real spin." The experimenter assigned the subject to the left or right wheel by a "random drawing." The drawing was rigged to match what the last subject in the wheel choice condition had chosen; the purpose of yoking subjects in this manner was to ensure equivalence in left and right wheel assignment between the spin-choice and wheel-choice conditions. When the wheel assignment was completed, *Person 1* appeared under the subject's wheel and *Person 2* appeared under the other wheel. The subject was then told to select a starting point and speed for the wheel. Just before spinning the wheel, the subject was also told that he or she might have an opportunity to spin the wheel more than once. Clicking on a button labeled *real spin* then set the wheels in motion.

Wheel-choice condition. The procedure for the wheel-choice condition was similar to that for the spin-choice condition. In this condition, the experimenter explained that Person 1 always had control over the choice of the wheel. During the demonstration, the subject was given practice at choosing a wheel. The wheel outcomes were the same as in the spin-choice demonstration condition. When subjects went on to the real spin, they chose a wheel again. The "Person 1" wheel was set to start at one of the $15 locations, whereas the "Person 2" wheel was set to start at one of the $10 locations; subjects were told, however, that the starting positions of the wheels were randomly determined. Once again, subjects clicked on *real spin* to set the wheels in motion.

In both conditions, when the wheels stopped spinning, the experimenter turned off the computer.[6] Subjects were then given a questionnaire. They were asked to indicate, on a scale of –2 (*extremely dissatisfied*) to +2 (*extremely satisfied*), how satisfied they were with the outcome of the spin. Subjects were then instructed to undo their outcomes in the following manner: "List *three* ways your outcome could have been different." As a manipulation check, subjects were asked whether they could remember (a) the outcome of their own wheel, (b) the number directly to the left of where their wheel landed, and (c) the outcome of the other person's wheel. Almost all subjects had perfect memory for these three numbers.

Coding. From the written protocols (i.e., "List three ways your outcome could have been different"), two judges who were blind to the experimental hypotheses and conditions independently coded the number, focus, and direction of the counterfactuals generated by subjects.

The coding scheme for the focus of the counterfactual was as follows: +1 = within-wheel counterfactual; 0 = no counterfactual; –1 = between-wheel counterfactual. Examples of responses coded as within-wheel counterfactuals are "I could have started the wheel at a different place" and "My wheel could have stopped a little earlier." Examples of responses coded as between-wheel counterfactuals are "I wish I had the other wheel" and "I chose the wrong wheel."

The direction of the counterfactual was coded in a similar manner: +1 = upward counterfactual; 0 = no counterfactual; –1 = downward counterfactual. Examples of responses coded as upward counterfactuals are "My wheel almost landed on 75 tickets" and "If I had chosen the other wheel, I could have won big money." Examples of responses coded as downward counterfactuals are "I almost went bankrupt" and "If I had been Person 2, I would have lost everything."[7]

The judges agreed 100% of the time on whether subjects had generated at least one codable counterfactual. Agreement concerning the presence of additional counterfactuals was 89%. Interjudge agreement on the focus of these counterfactuals was $r = .85$. When one judge coded a within-wheel counterfactual and the other coded a between-wheel counterfactual, the disagreement was resolved by a third judge. When the two judges agreed, either +1 (within wheel) or –1 (between wheel) was assigned; when only one judge coded a counterfactual, either +.5 or –.5 was assigned. When neither judge coded a counterfactual, zero was assigned. Interjudge agreement on the direction of these counterfactuals was $r = .92$. When one judge coded an upward counterfactual and the other coded a downward counterfactual, the disagreement was resolved in the same manner as above.

RESULTS

In a preliminary analysis, we examined the effects of wheel outcome and control on the total number of counterfactuals that subjects made (coding for both focus and direction). The average number of codable counterfactuals per subject was 2.85. There was no effect of wheel outcome, control type, or interaction between these factors on the number of counterfactuals generated, Fs < 1.

Focus of counterfactuals. In accordance with previous research (e.g., Kahneman & Tversky, 1982; Markman et al., 1993), the first counterfactual that each subject generated was analyzed. Table 1 shows the focus-of-counterfactual scores for subjects in all conditions. As can be seen, the relative incidence of within- and between-wheel counterfactuals varied substantially as a function of the type of control that subjects exerted over the wheel. An analysis of variance (ANOVA) showed a significant effect of control type, $F(1, 57) = 11.38$, $p = .001$. As predicted, spin choosers generated far more within-wheel counterfactuals ($M = .82$), and thus far fewer between-wheel counterfactuals, than wheel choosers ($M = .18$). There was no effect of wheel outcome on this measure, nor was the Control Type × Wheel Outcome interaction significant, Fs < 1.[8]

Direction of counterfactuals. Once again, the first counterfactual that each subject generated was analyzed. Table 1 shows the direction-of-counterfactual scores for subjects in all conditions. The main effects of control type and wheel outcome were not significant, Fs < 1. However, an ANOVA showed the hypothesized Control Type × Wheel Outcome interaction, $F(1, 57) = 5.96$, $p = .02$, on the incidence of upward and downward counterfactuals. As predicted, subjects whose own wheel almost hit 75 generated somewhat more upward counterfactuals if they were spin choosers than if they were wheel choosers. However, subjects whose own wheel almost hit Bankrupt generated somewhat more downward counterfactuals if they were spin choosers than if they were wheel choosers. Planned contrasts performed on both these effects were marginally significant: $t(57) = 1.61$, $p = .11$, for the former; $t(57) = -1.87$, $p = .07$, for the latter.[9] Thus the specific aspect of the game that subjects controlled led to a differential focus on either their own wheel or their opponent's wheel. This differential focus, in turn, seems to have had a predictable impact on the types of counterfactuals generated.

Satisfaction with outcome. A 2 (Wheel Outcome) × 2 (Control Type) ANOVA was performed on satisfaction with the outcome. A marginally significant effect of wheel outcome was found such that those who narrowly missed winning 75 tickets were actually *more* satisfied than those who narrowly missed going bankrupt, $F(1,$

TABLE 1: Focus and Direction of First Counterfactual and Satisfaction With Outcome

Measure	*Wheel Outcome*	*Control Type*	
		Spin Chooser	*Wheel Chooser*
Focus of first counterfactual	Own better/other worse	.91	.17
	Own worse/other better	.73	.07
Direction of first counterfactual	Own better/other worse	.31	−.23
	Own worse/other better	−.43	.20
Satisfaction with outcome	Own better/other worse	.66	.84
	Own worse/other better	.74	.04

NOTE: Positive numbers indicate relatively more within-wheel than between-wheel counterfactuals, relatively more upward than downward counterfactuals, and greater satisfaction. Negative numbers indicate relatively more downward than upward counterfactuals.

57) = 3.47, $p = .07$. More important, the predicted interaction between wheel outcome and control type on satisfaction was obtained, $F(1, 57) = 6.23$, $p = .02$. As seen in Table 1, subjects whose own wheel almost hit 75 were less satisfied if they were spin choosers than if they were wheel choosers, although this effect was not significant, $t < 1$. Subjects whose own wheel almost hit Bankrupt were more satisfied if they were spin choosers than if they were wheel choosers, $t(57) = 2.76$, $p = .008$. There was no effect of control type on this measure, $F < 1$.

The results on satisfaction were generally consistent with the pattern found for the direction of counterfactuals in that subjects whose own wheel almost hit Bankrupt were more satisfied, and generated more downward counterfactuals, if they were spin choosers than if they were wheel choosers. To examine the relationship between satisfaction and counterfactuals a bit more closely, the correlation between direction of counterfactuals and outcome satisfaction was calculated, partialing out the contributions of the main effects and interaction between the independent variables (i.e., wheel outcome and control type) to this relation. Consistent with previous research (e.g., Johnson, 1986; Markman et al., 1993), satisfaction decreased as the proportion of upward to downward counterfactuals increased, $r(55) = -.21$, $p = .05$. This finding supports the notion that upward counterfactuals engender dissatisfaction whereas downward counterfactuals engender satisfaction. Although we suspect that the relation between counterfactuals and affect is reciprocal (i.e., initial satisfaction influences the direction of the counterfactual *and* the direction of the counterfactual influences subsequent satisfaction), it is difficult to imagine how the patterns of satisfaction we obtained could have been produced independently of counterfactual thinking processes, because all subjects experienced the same objective outcome (winning 10 tickets); what was different for subjects was the outcome that almost happened on their own wheel, as well as what could have happened if they had had the other wheel.

DISCUSSION

These results provide support for the idea that people will generate counterfactuals about aspects of events over which they have perceived control. Even though all subjects experienced the same objective wheel outcome, attention was drawn toward their own wheel when they had control over the spin and toward the other wheel when they controlled the choice of wheel. In general, the features of a given situation that are focused on determine the alternatives to reality that are imagined. In turn, the alternatives that are imagined may then shape one's subjective affective experience with the event.

As noted earlier, the idea that controllability influences counterfactuals is informed by work that describes a general tendency to focus attention on the self. This focus on the self has been demonstrated in several ways. For instance, research on the generation effect (e.g., Greenwald & Banaji, 1989; Slamecka & Graf, 1978) has shown that information generated by the subject has a distinct memorial advantage over information generated by other means. Additionally, Ross and Sicoly (1979) have suggested that the greater focus on information about the self leads people to take more responsibility for a joint outcome than they should (the self-centered bias). In terms of counterfactual generation, those aspects of the self that involved conscious control may draw special attention. Counterfactual thoughts involve what might have been different in a situation. For choices that were consciously made (e.g., which wheel to pick), it is likely that more than one alternative actually *was* considered before the choice. Such a counterfactual alternative should therefore be strongly accessible and likely to be generated. In other words, any route that was considered prior to a choice should become a likely counterfactual after the outcome, and such prior consideration is most likely when one has control and makes conscious decisions.

We further suggest that it may be especially functional to focus attention on, and hence make counterfactuals

about, one's own controllable actions. Heider (1958) suggested that one way people strive to maintain control over their environment is to ascribe cause to events. Furthermore, Wells and Gavanski (1989) have demonstrated that the mutable features of an event—that is, those that people make counterfactuals about—are often seen as the causes of an event. One implication of the present research is that counterfactualizing about controllable actions should be more likely to enhance one's sense of retrospective control (Thompson, 1981) over the environment—that is, feelings that one had control over the past—than counterfactualizing about noncontrollable actions. For example, thinking "I should have brought my umbrella today" should engender more feelings of retrospective control than thinking "If only it hadn't rained today," because only the former is a controllable action.

Counterfactual generation may be important for instilling feelings of control about future events as well as past events. Indeed, a study by Gilovich and Douglas (1986) suggests that counterfactual generation can help people establish an illusion of control (Langer, 1975) in the interests of maintaining an optimistic, though biased, outlook on the future (cf. Taylor & Brown, 1988). In the Gilovich and Douglas study, subjects tended to make "undoing" comments about their losses in a Bingo game but to "bolster" their wins—that is, explain away losses but accept wins at face value. Importantly, however, this "biased evaluation" effect was limited to conditions under which subjects had some (illusory) control over a feature of the game. This finding suggests that counterfactualizing about the controllable features of an event is more likely to help an individual feel optimistic about the future than counterfactualizing about noncontrollable features.

This discussion has particularly important implications for recent research by Markman et al. (1993), who suggested that people make counterfactuals in order to prepare for the future. It may be that if counterfactuals are to have this kind of functional value, it will be necessary to have some degree of control over these actions if and when they do occur in the future. In effect, there may be little functional value in counterfactualizing about noncontrollable actions. In fact, it has been shown that intentions to perform a given behavior are much lower if people feel that they will not be able to exercise control over performing the behavior in the future (Ajzen & Madden, 1986).

Though not explicitly concerned with counterfactuals per se, recent work by Testa and Major (1990) provides further support for the idea that actions need to be controllable for counterfactuals to serve any functional value. In their study, subjects engaged in an essay-writing task, received performance feedback, and were exposed to either upward social comparison information (most people did better on the task) or downward comparison information (most people did worse). Half the subjects were also told that they had the ability to improve their performance in the future (controllable condition), whereas the other half were told that there was nothing they could do to improve their performance (uncontrollable condition). Results indicated that subjects exposed to upward comparison information persisted to a greater extent on a second task *only* when they felt they had an opportunity to improve their performance.

In sum, we believe the current research has demonstrated the important role of perceived control in counterfactual thinking processes. People are more likely to counterfactualize about aspects of events over which they have perceived control. In turn, the alternatives to reality that are imagined may shape the affective experience of the event. In general, it may be that the counterfactuals people make about controllable events are the ones most likely to serve them well in the future.

NOTES

1. Kahneman and Miller's (1986) original scenario asked, "Who would spend more time thinking about the event?" When we originally created the downward version of this scenario, however, subjects were confused by this question, and so it was changed to "Who will feel better about the match that night?" For consistency, we therefore made the same change to the upward scenario as well.

2. The prediction can be made only for the relative number of within- and between-wheel counterfactuals made by spin choosers versus wheel choosers. We cannot predict that spin choosers will make more within- than between-wheel counterfactuals or that wheel choosers will make more between- than within-wheel counterfactuals. The reason is that, overall, within-wheel counterfactuals are more likely due to the attention given to one's own wheel.

3. Although the numbers on the wheel corresponded to the number of lottery tickets subjects thought they would be winning, a dollar sign was placed in front of each number to enhance the perception that subjects could actually win money as a result of participating in the experiment.

4. The computer program was set up so that the Person 1 wheel would always be the one that narrowly missed landing on $75 or Bankrupt.

5. Owing to the mechanics of the computer program, when subjects made clockwise or counterclockwise adjustments to the Person 1 wheel, the Person 2 wheel also moved in synchrony with these adjustments. Although this meant that subjects were in a sense "controlling" the other person's wheel as well as their own, it seems reasonable to assume that subjects concentrated to a much greater extent on controlling their *own* wheel outcome.

6. To see the extent to which subjects focused on one or the other wheel outcome, it was important that the wheels not be visible to subjects when they were later asked to make their counterfactuals.

7. As can be seen, within- and between-wheel counterfactuals can both be either upward or downward. When coding for counterfactual focus, the judges were interested in the particular wheel that each counterfactual was focused on. When coding for counterfactual direction, the judges were interested in whether the particular counterfactual had specifically simulated a better or worse possible world. To illustrate, the statement "My wheel could have landed on $75" would be coded as both a within-wheel and an upward counterfactual. However, although the statement "The outcome on my wheel could have

been different" could be coded as a within-wheel counterfactual, it is ambiguous as to whether it is an upward or downward counterfactual. Therefore, this statement would receive a zero for the direction of the counterfactual.

8. Consistent with the results found on the first counterfactual generated, an ANOVA performed on the total number of within-wheel counterfactuals showed a significant effect of control type, $F(1, 57) = 11.42$, $p = .001$. Spin choosers generated proportionately more within-wheel counterfactuals (90%) than wheel choosers (66%). There was no effect of wheel outcome, nor was the Control Type × Wheel Outcome interaction significant, Fs < 1.

9. An analysis for all counterfactuals on the proportion of upward counterfactuals also revealed a significant Control Type × Wheel Outcome interaction, $F(1, 57) = 6.33$, $p = .02$, replicating the pattern found for the first counterfactual generated. Subjects whose own wheel almost hit 75 generated proportionately more upward counterfactuals if they were spin choosers (54%) than if they were wheel choosers (43%). Subjects whose own wheel almost hit Bankrupt generated proportionately more downward counterfactuals if they were spin choosers (68%) than if they were wheel choosers (40%).

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